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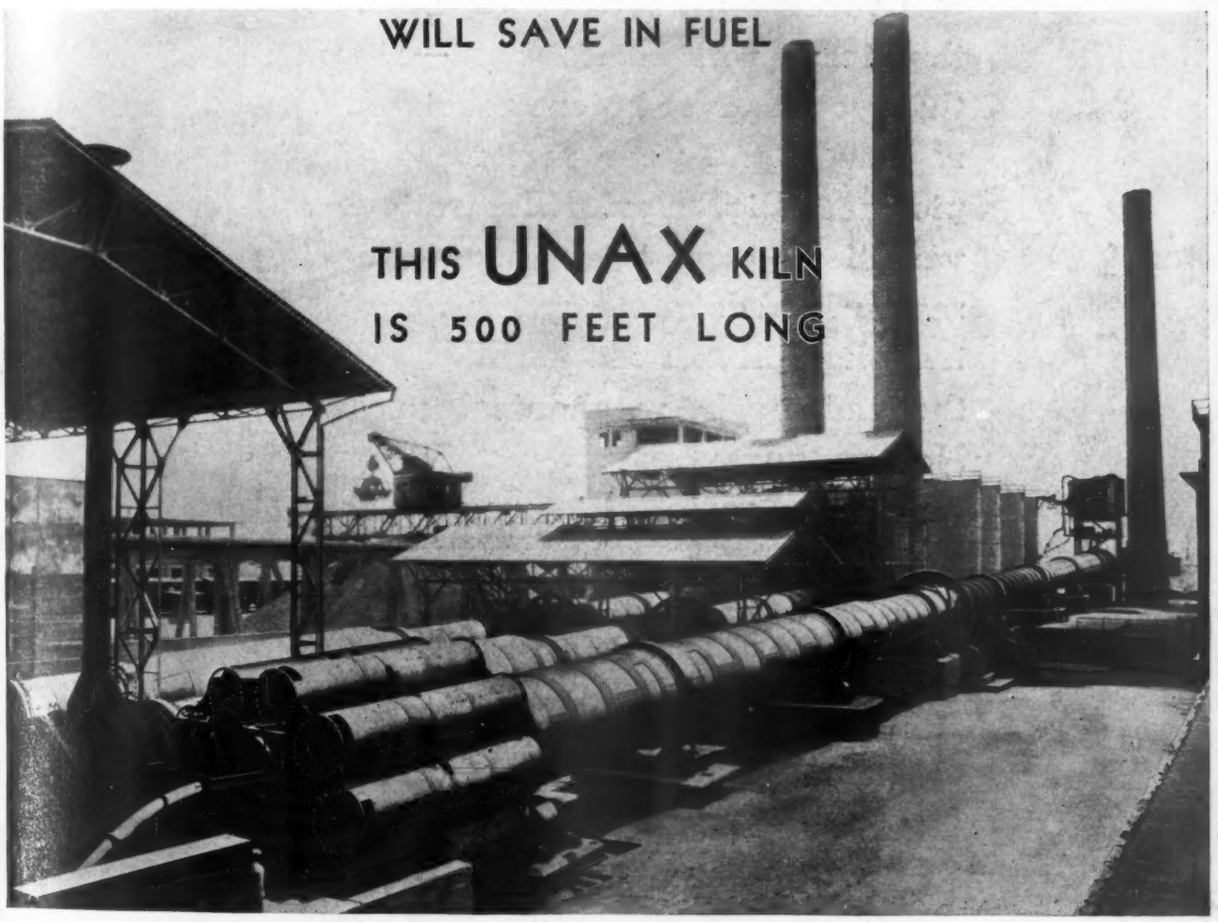

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(Issued Monthly)

December, 1934

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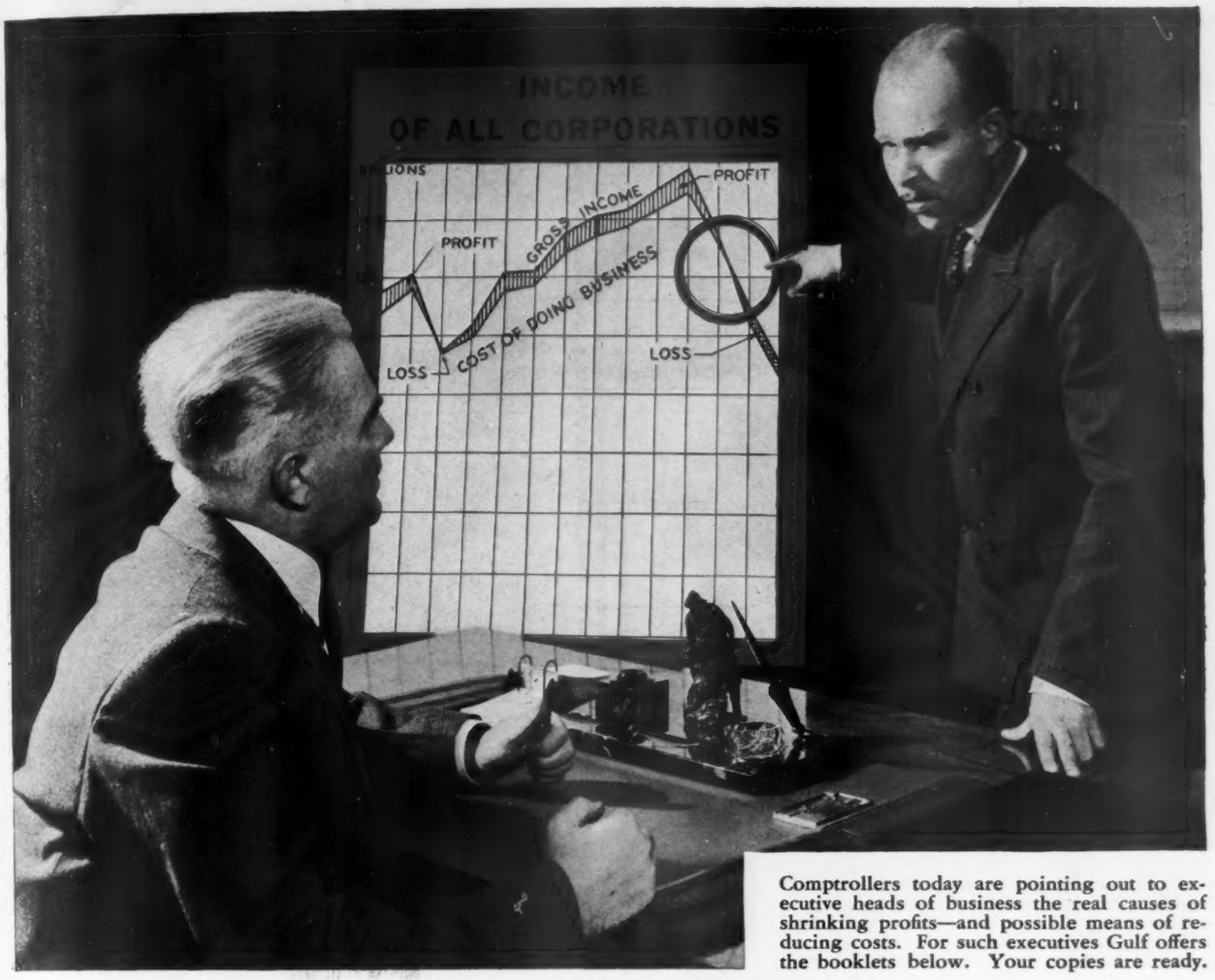

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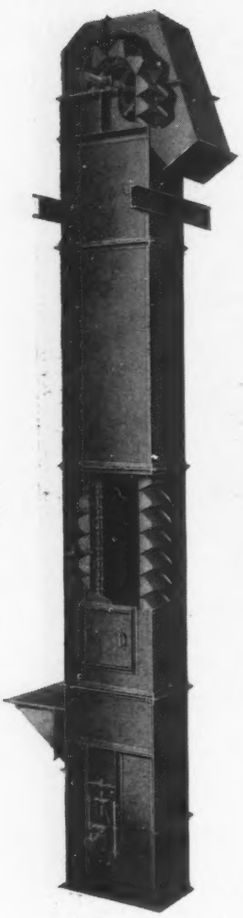

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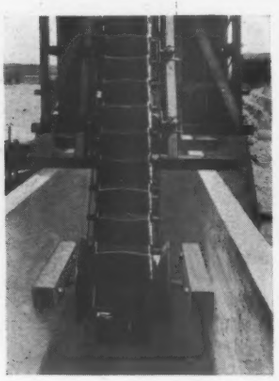

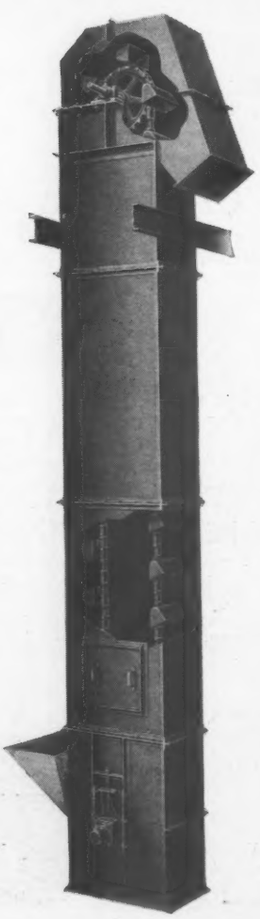

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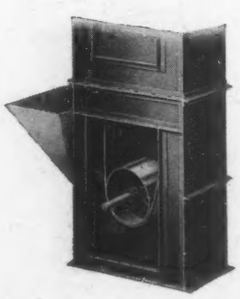

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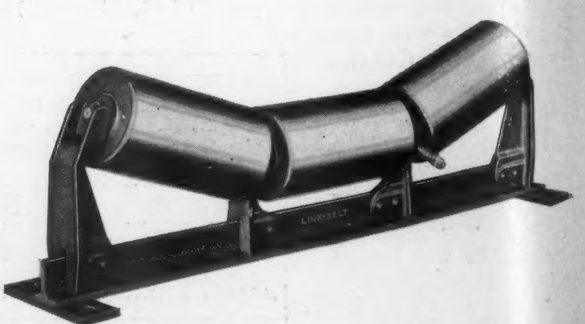

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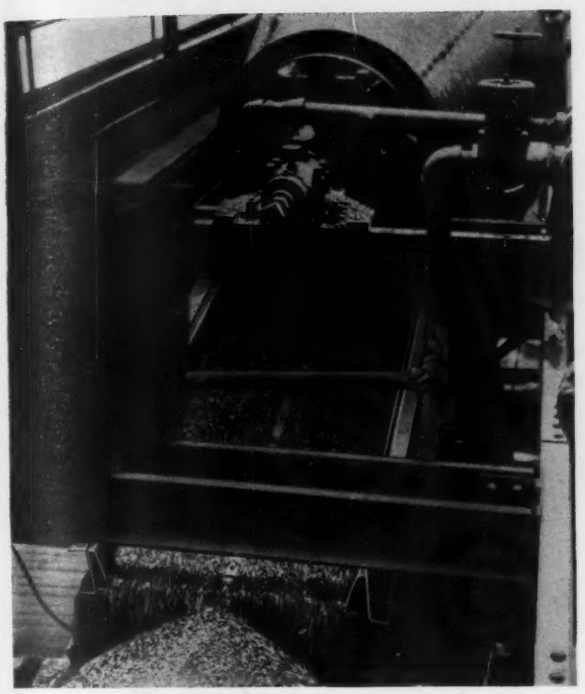

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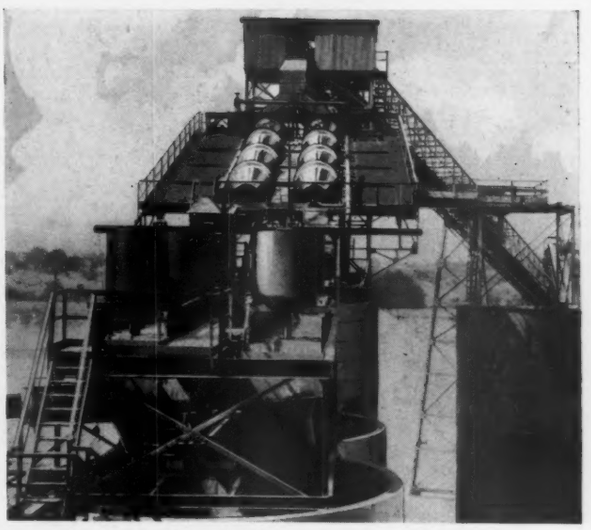

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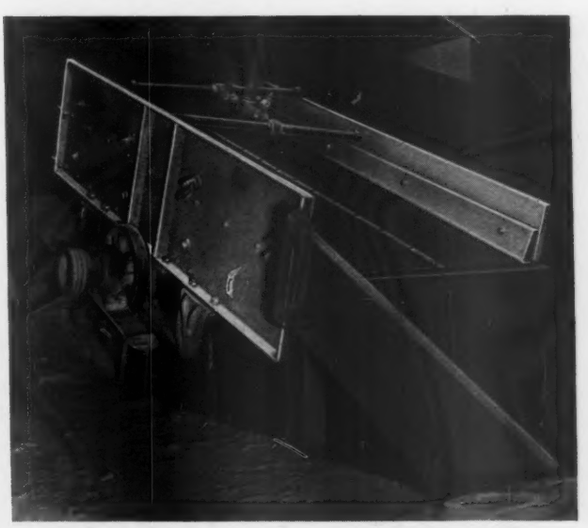

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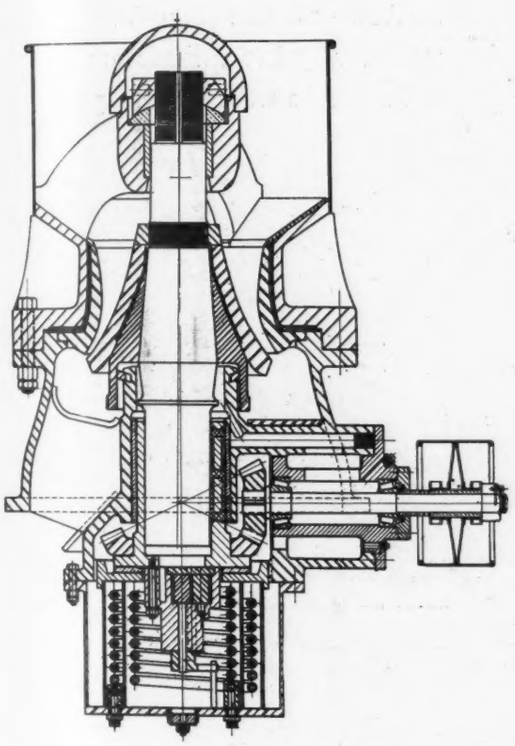

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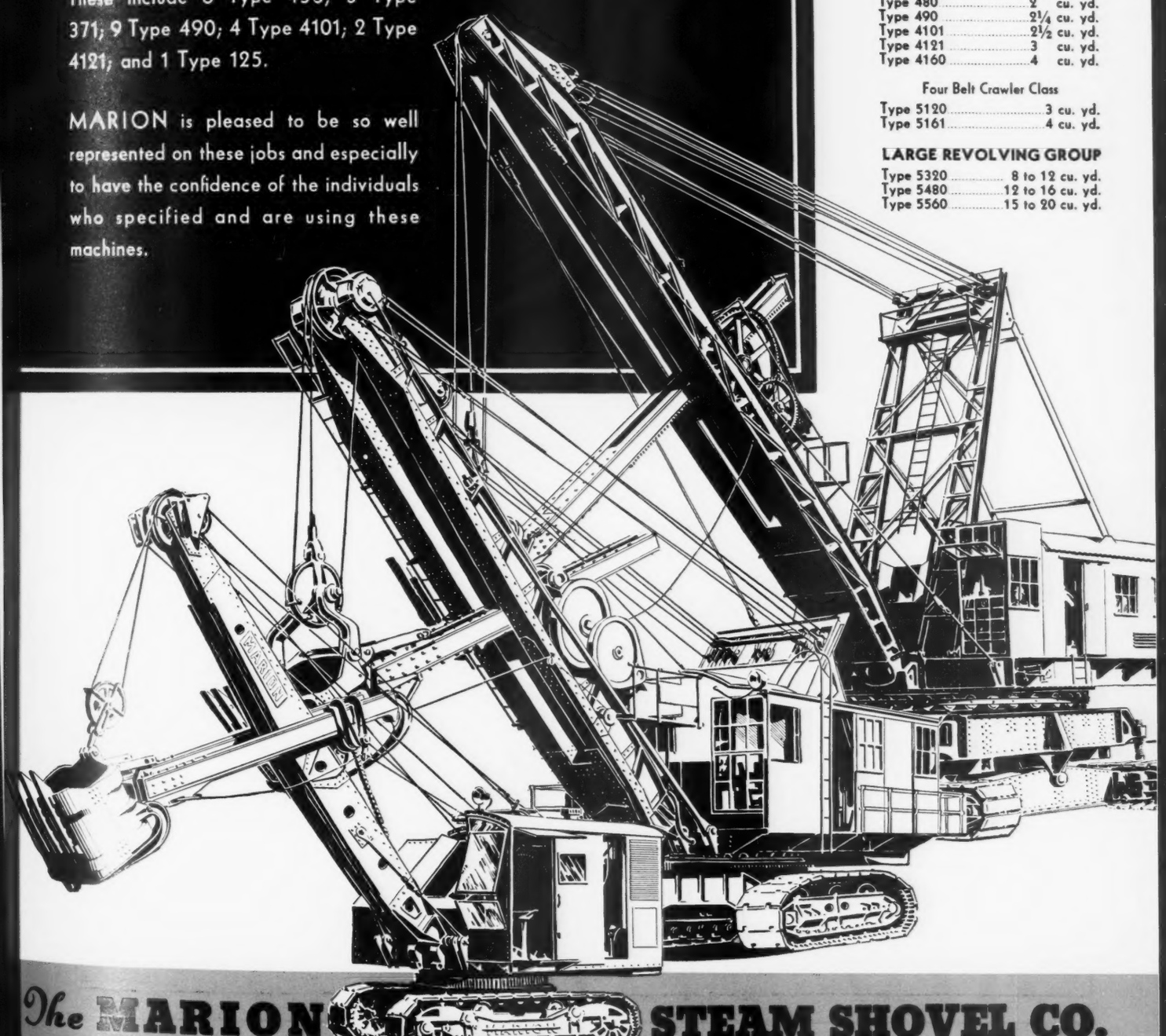

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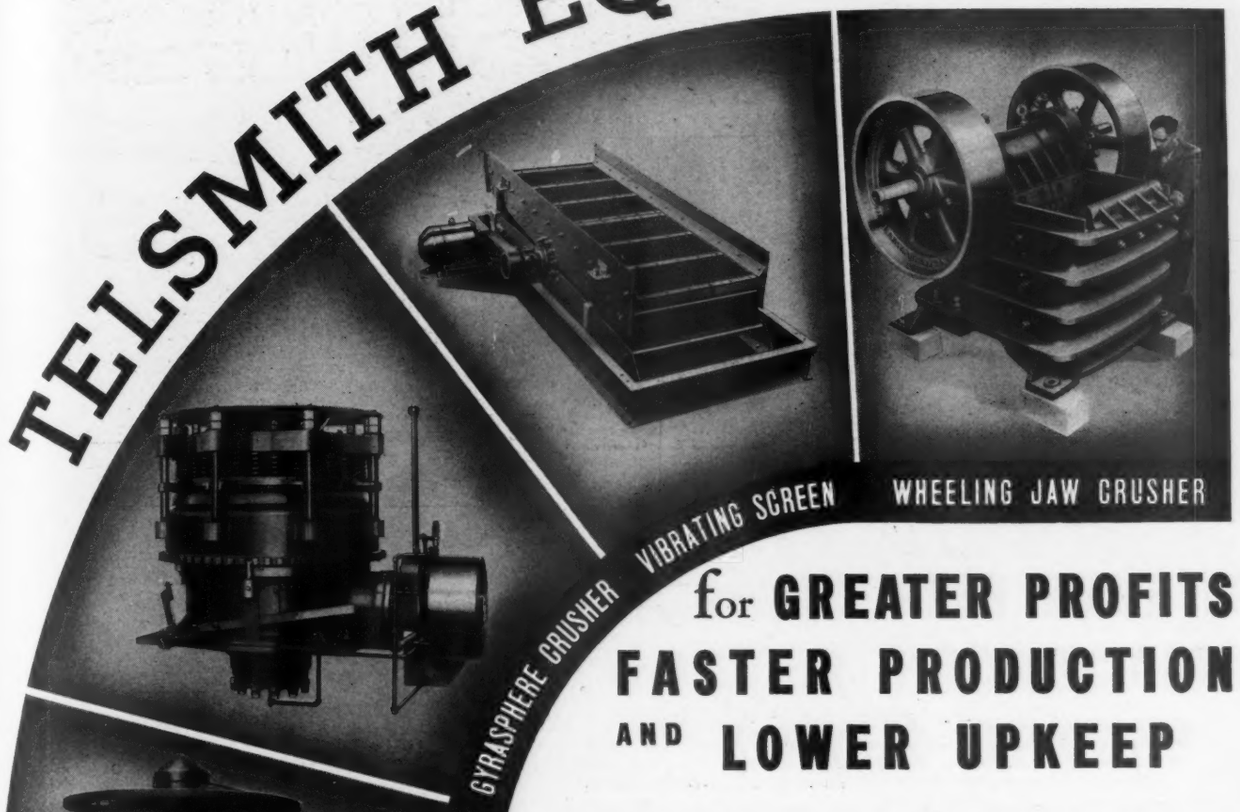

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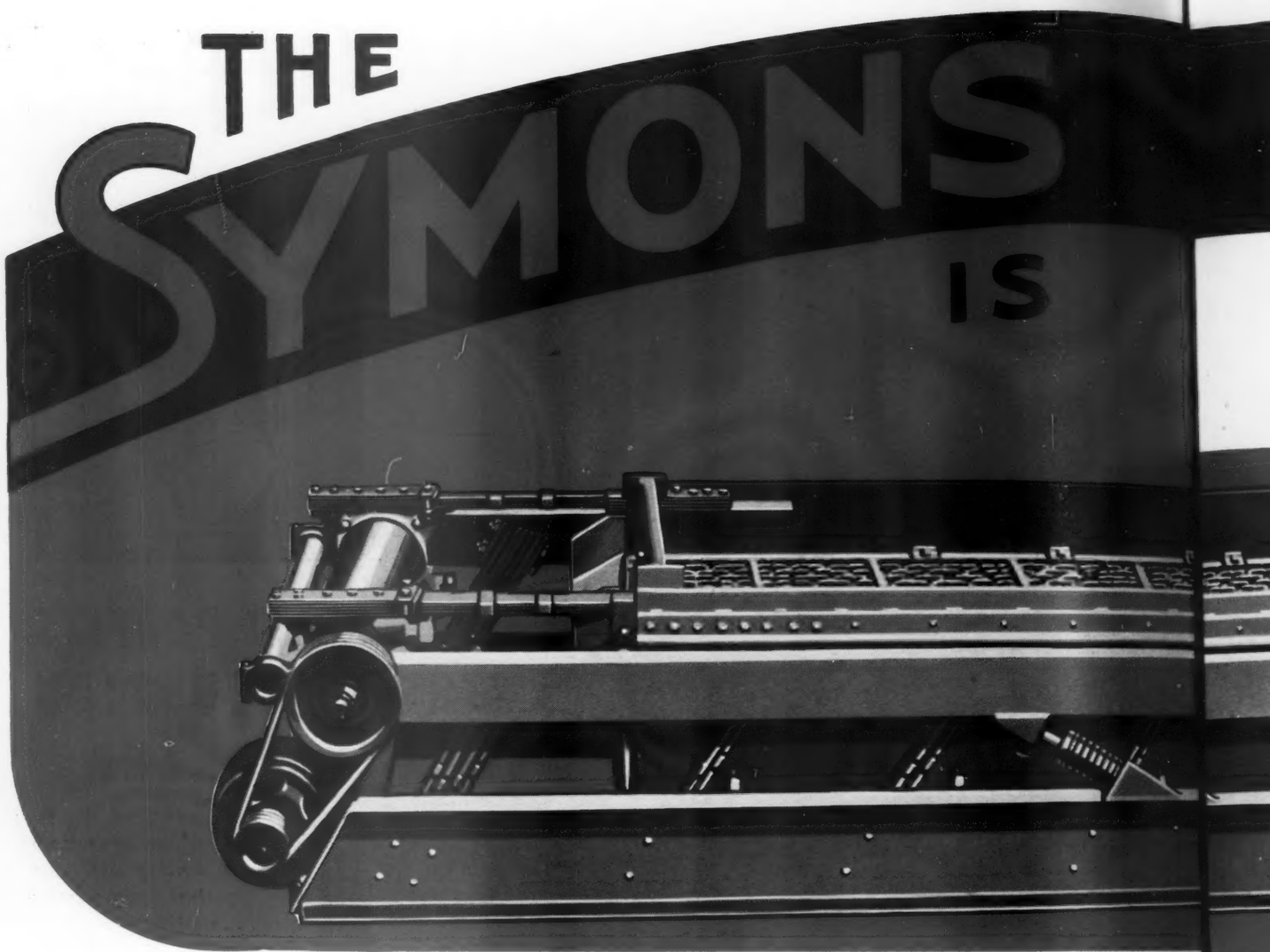

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4. the **trade-mark** . . . "U.S." appears on more rubber products than any other trade-mark. This is your guarantee of superiority, dependability

5. the **name** . . ."U.S." Matchless is everything the name implies—an outstandingly superior product of the world's largest producer of hose

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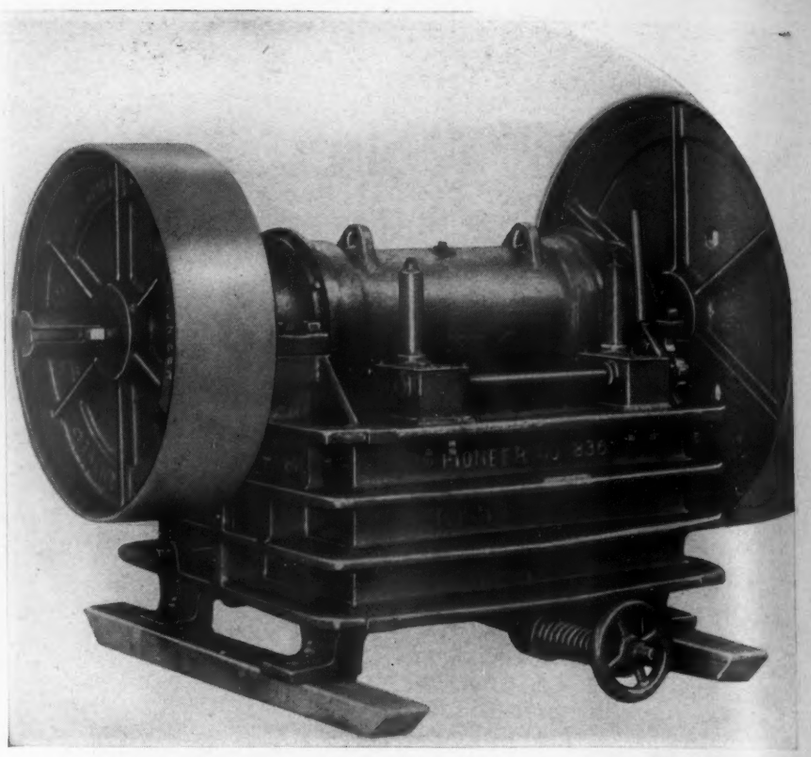

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And meeting vibration in a crusher is a hard job for any bearing, even an SKF! It's work that makes it easy to prove the extra value of SKF Bearings! For the SKF Spherical Roller Bearing is self-contained, self-aligning! It's practically the only roller bearing ever produced for combined radial and thrust loads that is made as well as a ball bearing! It stands up day after day . . . needing no adjustment and requiring only a little lubrication! It answers *your* bearing problems . . . every time!

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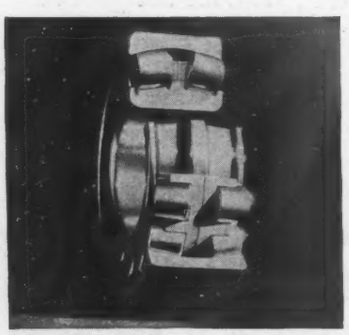

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Completely Designed, Engineered and Built by

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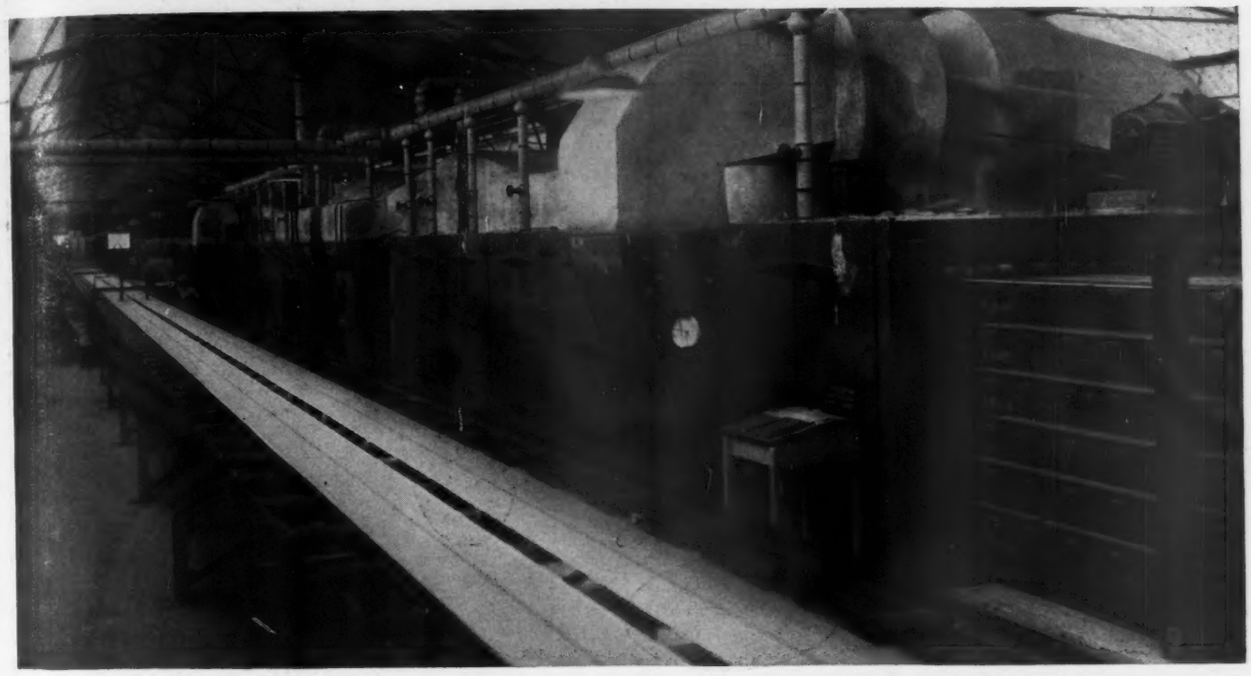
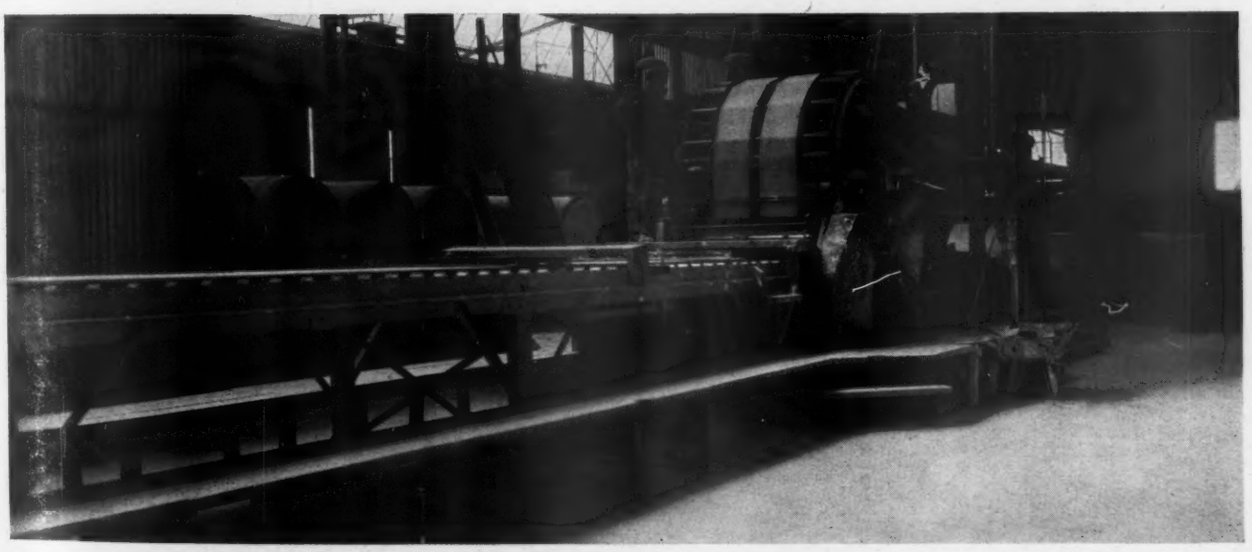


● *View of COE Dryer and Setting Belt Table in the plant of Gyproc Products, Ltd., Rochester, Kent, England.*



● *View of Forming Machine and Paper Feeders in the plant of Gyproc Products, Ltd., Rochester, Kent, England.*

UNITED STATES MACHINERY CO., INC.

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LOCK No. 2 LOCK No. 11

LOCK No. 3 LOCK No. 16

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FORT PECK

Portable and stationary Fuller-Kinyon Cement Pumps have helped to build the world's great concrete structures. How they have been employed to gain speed in construction with a maximum of economy can be seen from our bulletin which fully illustrates preferred ways of handling cement for small as well as large jobs.

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Two of every three dollars paid for Bucyrus-Erie machines is spent by men who have learned by experience that it is profitable to buy this particular make of machinery.

This is more convincing evidence of profit-making performance than any written testimonial. *Modern* Bucyrus-Eries can bring the same profit-making possibilities to your job . . . whether it be large or small. Bucyrus-Erie Company, South Milwaukee, Wisconsin. Excavating, drilling and material-handling equipment.

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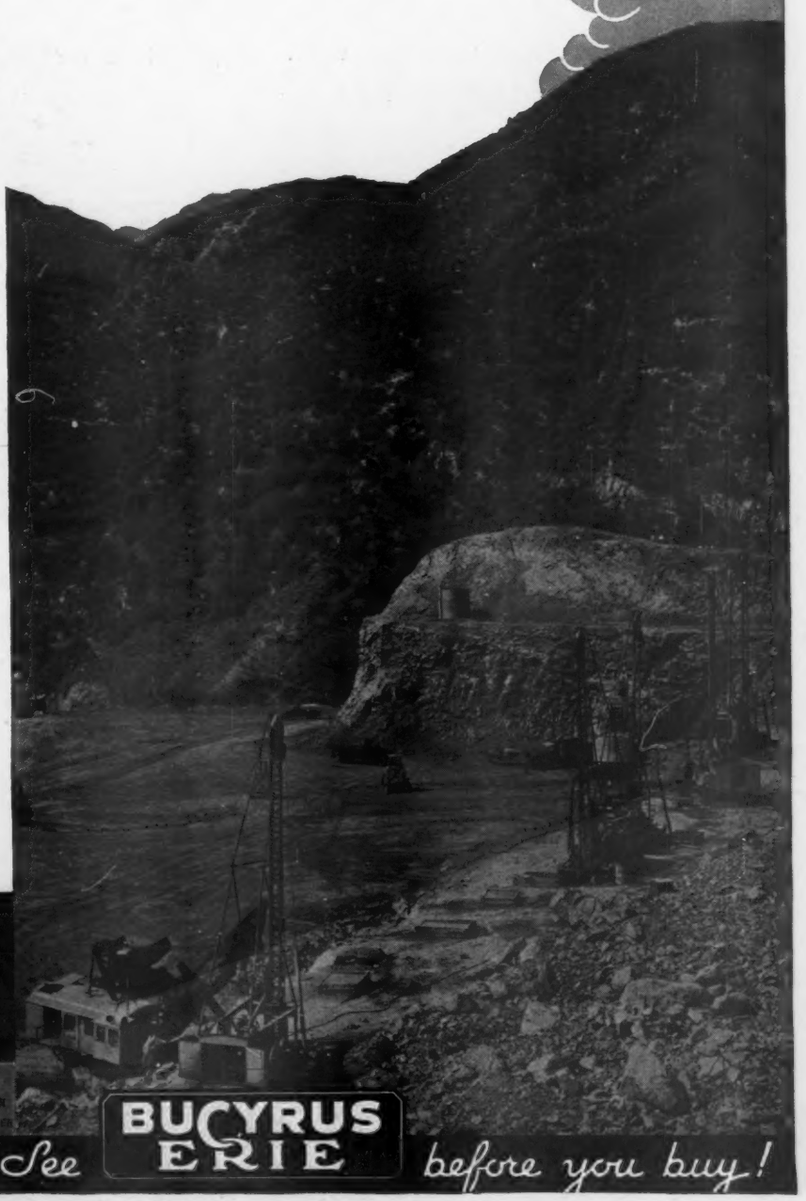
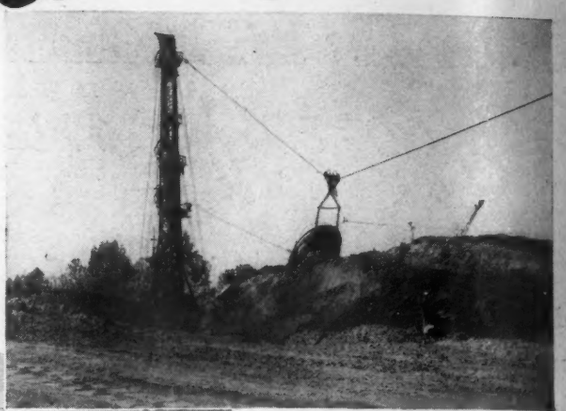
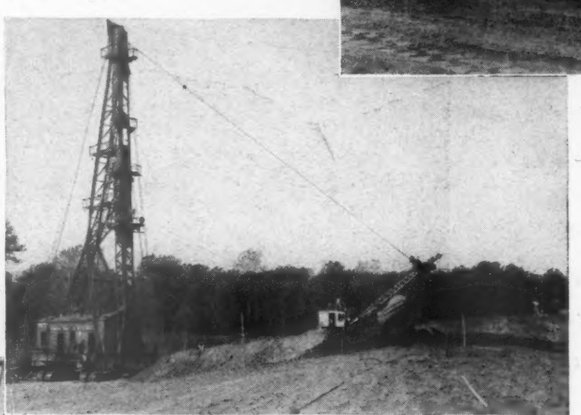


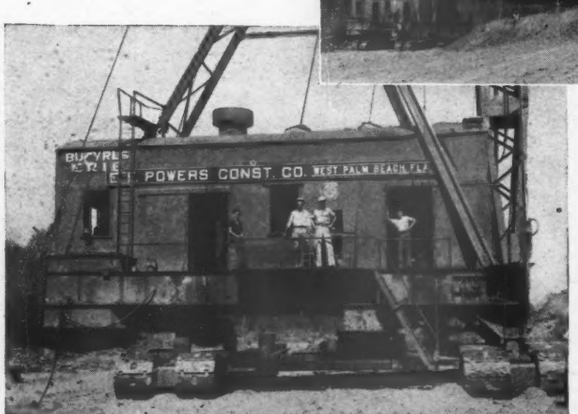
WHEN IT'S A TOUGH JOB THEY USE Williamsport



Here's one of the largest Levee jobs on the Mississippi, measuring 400 ft. from toe to toe, 43 ft. deep and runs about 30,000 yards per 100 ft. station. The pit spans range from 600 to 900 ft. requiring 1,150 ft. lengths of 1½" wire rope.

These great machines are 100% equipped with Williamsport Wire Rope, giving utmost satisfaction.





We emphasize the point that when it comes to large ropes, particularly, we suggest that you use Williamsport for best results.

Powers Construction Company feel this way about it because they have had unhappy experiences with large ropes of other makes, and they have found Williamsport more uniform and more durable in the heavy going in which they are engaged.

Why not send your next inquiry to us and verify our claims.

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THE EVIDENCE SHOWS FASTER

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We'll be glad to show you a P&H shovel with Split Second Control. Seeing one at work is the way to get the evidence of what P&H can do for you.

Production for Highway Construction Jobs

THERE'S something satisfying about the way these new P&H shovels tear into a job . . . something that makes you take off your hat! Their speed is impressive. There's no loss of time, no waste motion. The extra power makes loads seem lighter. Special shock absorbing construction smooths out punishing shocks. All these improvements are summed up in Split Second Control to give you greater yardage at lower cost.

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Excavators . . . Cranes . . . Hoists . . . Arc Welders

AMSCO DREDGE PUMPS

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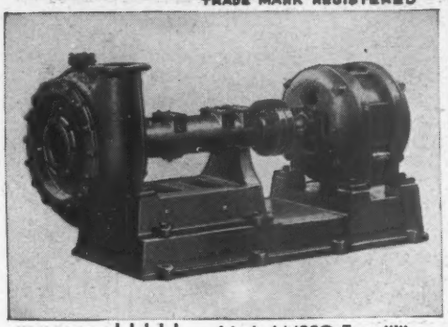
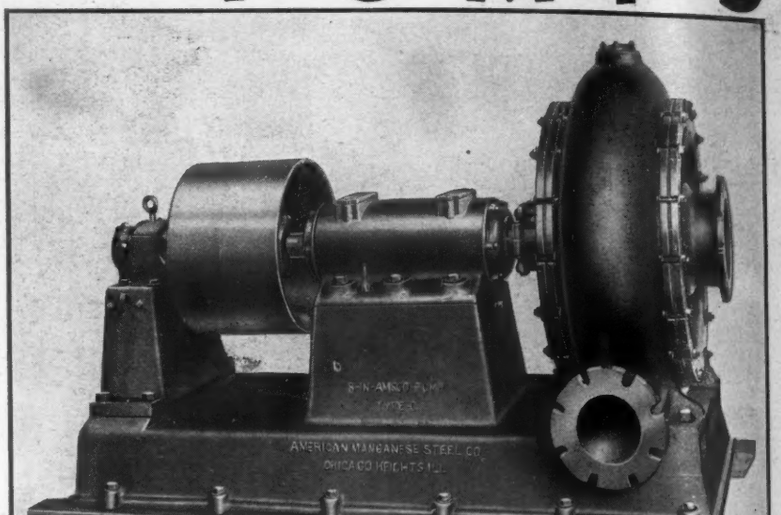


6-inch AMSCO Type "I", Form 20 Pump, Directly Connected Design with Electric Motor, Right Hand, Top Discharge.



8-inch AMSCO Type "C", Form 30 Pump, Belted Design, Left Hand, Bottom Discharge.

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DURABLE CONSTRUCTION AND LASTING EFFICIENCY

AMSCO Dredge Pumps reflect their ability to stand up when being pressed the hardest for production. They afford maximum protection against operation shutdowns.

AMSCO Dredge Pumps have been carefully designed to meet all the requirements of sand and gravel pumps. All wearing parts are made of manganese steel. They stand up under the severest tests. Their use will save delays and reduce operating costs.

AMSCO Pumps embody: sturdiness with rigidity of construction; simplicity; unusually heavily proportioned shafts and bearings with maintained accuracy of shaft alignment; ample lubrication for bearings with free-flowing oiling facilities, together with large oil reservoirs; accessibility and quick, positive impeller adjustment; ease of replacement of wearing parts; and remarkably high capacity under severe head conditions.

The continued success of AMSCO Pumps is due to a policy of building with quality, assuring Durable Construction and Lasting Efficiency, and their correct installation by experienced engineers familiar with the problems involved in pumping abrasive materials.

AMSCO Pumps are built in standard 3-inch, 4-inch, 5-inch, 6-inch, 8-inch, 10-inch, 12-inch, 16-inch, and 18-inch sizes for all types of drives.

Pumps built to meet individual user's requirements.

Flap Valves, Elbows, Pipe, Pipe Flanges, Ladders, Drive Gears, Cutter Heads, Teeth.

We invite your inquiry for performance data and details on the type of AMSCO pump best suited to your operations.

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Owned by American Brake Shoe & Foundry Company

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Foundries at Chicago Heights, Ill.; New Castle, Del.; Denver, Colo.; Oakland, Calif.; Los Angeles, Calif. • Offices in Principal Cities.

In sand and gravel plant equipment you can best combat rapid wear due to abrasion and breakage due to shock by using cast parts of AMSCO manganese steel. We will be glad to furnish detailed information on request. Send complete details of your requirements with inquiry.

Rock Products
With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Volume XXXVII | Chicago, December, 1934 | Number 12

Recovery Progress—Trends

A VERY MARKED CHANGE in business sentiment—a return of some old-time American business optimism—has been evident in the last few weeks. It is evident in nearly all one reads, what one hears from friends and associates, what one observes at such gatherings as the recent annual meeting of the Portland Cement Association. The primary reason, of course, is real business (and prospect of profits) in sight, if not yet in hand.

Doubtless many business men feel that the Government is taking a more sympathetic attitude toward their side of current controversies. Even some of the original diehards are now openly advocating cooperation with Government agencies. The example of the banking fraternity is outstanding and probably has been a big factor. Business men and bankers, in spite of all the criticism leveled at them, have a lot of common sense; they fought as long as they thought they could accomplish anything against the approach of the steam roller, but they were not going to be martyrs, throwing themselves under it in a hopeless attempt to stop this steam roller, when they know it can't be stopped, at least not now. They are doing the wise thing and climbing on board to help steer, so it will stay on the pavement and accomplish a useful purpose.

Help Guide Rather Than Obstruct

The steam roller, of course, is the convincing evidence of overwhelming popular support of the social and industrial changes which the New Deal is conceived to stand for. "A true function of the head of the Government of the United States," said President Roosevelt to the nation's bankers, "is to find among many discordant elements that unity of purpose that is best for the nation as a whole. This is necessary because government is not merely one of many coördinate groups in the community or the nation, but Government is essentially the outward expression of the unity and leadership of all groups." That certainly is a masterly statement; and even such an outstanding and outspoken critic of the Administration as David Lawrence, of the *United States News*, told these same bankers, "I regard President Roosevelt as a great political leader. It has been my privilege to know seven men who have occupied the post of Chief Executive of the United States. I would say without hesitation that none has had the remarkable gift of intuitive reasoning or the faculty of perceiving the fine currents of American life that is possessed by the man in the White House today. To some critics this is a sign of weakness, a shortcoming in character. To me it is just the opposite. I believe the true character of politics is a kind of patient tolerance, a readiness to change when experience demonstrates the unsoundness of a course pursued, a breadth of view and a breadth of mind which is ready to change a public policy the moment the facts persuasively convince the makers of public policy that such a change should be made."

Business (But Not Yet Labor) Tolerant

It is not so remarkable as appears at first glance that bankers and business men, being men of practical wisdom, decided it better to become a little more politic themselves, and work with such a man as the President rather than against him. They have consciously or unconsciously decided to adopt the advice of Henry Ford, who recently said: "Why, the depression would be over for the whole country very soon if American industrialists would just forget these alphabet schemes and take hold of their industries and run them with good, American business sense. They should take hold of their country, too, in the same way and run it with good, sound American sense."

It is unfortunate that leaders of labor, as represented by the American Federation of Labor, also do not see the light and adopt some of the tolerant attitude invited by the President and accepted by industrial leaders. As the situation is now the American Federation of Labor appears to be the main obstacle to the return of prosperity under the New Deal.

What Is Profit, and How Much?

Finding little to criticize in the President's talk to bankers, skeptics have seized on his definition of the profits system: "It is the spirit of American institutions that wealth should come as the reward of hard labor of mind and hand. That is what we call the profit system." Where, say the critics, does capital come in; isn't capital entitled to a profit? It would seem to a reasoning person that the President amply covered the point in "hard labor of the mind," for one may observe that most of the hard labor of the mind in business and industry has to do with the profitable employment of capital. Why should capital, per se, without mental effort, be entitled to a profit? Moreover, the President, since his talk to bankers, has fixed 5% as the rate of interest on partially government-guaranteed home loan mortgages—a nearly riskless investment. This statement and this later act have probably had much to do with a return of business confidence.

Prices Sure to Increase

Another act of the President which speaks louder than words is the restoration of the 5% cut in Government salaries effective July 1 next. This is everywhere accepted as the best evidence of certainty in rising costs of living—including rentals. Also in the offing is legislation to establish so-called unemployment insurance by means of a payroll tax of 4½ to 5%, to be borne by worker and employer alike. It is probable that old-age pensions will come before the next congress. All this is designed to achieve "economic security," the prime objective of the New Deal. It will all add to the costs of doing business; consequently a rise in the general price level is apparently inescapable.

Rehabilitation Programs to the Front

Steel being the basic material entering all industrial rehabilitation programs—that is the re-equipping of industry with modern machinery—it is not surprising that the steel industry itself has started modernization of its own plants. The *Wall Street Journal* says: "Construction now in progress, involving expenditures of between $45,000,000 and $50,000,000, is regarded by many steel authorities as the beginning of a far-reaching modernization program in the industry. Obsolescence has been the big

problem of some of the leading steel companies during the depression. With earnings showing a pickup, several of them have started on the work of plant improvement postponed while conditions were unfavorable. Other industries also have held in abeyance undertakings of this character in recent years. Hence, pent-up orders from this source in the future may well prove to be a strong influence in reviving demand for durable goods." The United States Steel Corp. is a leader in this rehabilitation program; it being also one of the two most important producers of portland cement should have much significance to the cement industry.

The Standard Statistics Co. has completed a survey of proposed capital expenditures by nationally known industrial companies showing that seventeen major firms are planning or have spent $1,000,000 to $15,000,000 each on plant expansion. Commenting on the results of the survey, the service says:

"No discussion of business recovery prospects is complete without mention of the fact that political uncertainties have driven capital into hiding and that heavy capital expenditures on new plants will be withheld until profit opportunities are better defined. The truth of the matter is, however, that numerous companies have recently undertaken or are planning relatively important capital outlays on new facilities. The subjoined tabulation is obviously quite incomplete, but it clearly indicates that a few, at least, of the more important industrial companies are now willing to risk capital on new plants."

A list of companies which have undertaken since January 1, 1934, or which contemplate capital expenditures of more than $1,000,000, according to the service, follows:

Ford Motor	$15,000,000
Packard	6,000,000
Allied Chemical and Dye	5,000,000
American Cyanamid and Pittsburgh Plate Glass	7,000,000
E. I. du Pont de Nemours	15,000,000
Mathieson Alkali	7,000,000
Union Carbide and Carbon	10,000,000
Standard Brands	2,000,000
Hiram Walker-Gooderham and Worts	6,000,000
Union Oil of California	2,000,000
Socony-Vacuum Oil	5,000,000
Standard Oil of California	4,000,000
Celanese Corporation	1,000,000
National Steel	12,000,000
United States Steel	5,000,000
Wheeling Steel	2,500,000
Youngstown Sheet and Tube	8,500,000

Rehabilitation of Buildings, Too

Contracts for alterations and additions to all classes of structures have doubled in volume this year as compared with 1933, and rehabilitation and improvement of neglected property is growing into a national program, according to Thomas S. Holden, vice-president of F. W. Dodge Corp. In the 37 eastern states the amount of such work recorded in the first nine months this year was $277,878,300, compared with $139,418,000 for the corresponding period of 1933. A little over half this year's modernization expenditures were made on privately-owned commercial, industrial and residential buildings. The largest single item in this year's record was $56,213,800 for commercial building improvements, a 69% increase for this class of work over the corresponding period of last year; alterations and improvements for residential structures totaled $45,977,100, a 36% increase over last year. These figures do not include small repair jobs, or many jobs resulting from loans made under the new Federal Housing Administration plan.

Federal Loans to Industry Made Easier

An official announcement issued Jesse H. Jones, chairman of the RFC, on November 9, was in part as follows: "Industrial concerns, eligible to borrow funds from the Reconstruction Finance Corporation for the purpose of maintaining and increasing employment, have not yet taken full advantage of the assistance which the RFC is prepared to extend. The directors of the RFC feel that these loans should be made in such a way that the available funds can be utilized as fully as possible for the advance of permanent business recovery. This objective can be accomplished best if the moneys loaned by the RFC are used principally to supply funds for the payment of labor and the purchase of materials incident to the normal operation of the business, rather than for the payment of existing indebtedness, though in exceptional cases a small part of the loan may be used for payment of existing debts or for the financing of construction, improvements and/or repairs that do not materially increase capacity. When a loan is to be used primarily for labor and materials, a small portion of the loan may be applied to these latter purposes when necessary to assure ordinary and efficient operation. The RFC will make loans in coöperation with banks, or by the purchase of participations in loans made by banks. In cases of national banks, only the bank's participation in such loans, rather than the full amount of the loan, must be within the legal limit which may be loaned to any one customer, and accordingly this plan will allow substantially greater credit to be extended through such channels to borrowers who are already borrowing up to their legal limit."

Experience With Applicants for Government Loans

William H. Pouch, president, Concrete Steel Co., New York City, chairman of the industrial advisory committee of the Second Federal Reserve District, recently described a "Few Months' Experience with Working-Capital Loans" to a group of New York credit men. The reasons for rejection of various applications are interesting:

"(*a*) The owners of the business, realizing the present business conditions, are desirous of selling out to the party making the loan, or

"(*b*) Very poor management has been exercised during the past ten years on the part of sales, production or financial departments, and I am sorry to say that of these three classes of poor management, poor financial management predominates.

"Others show that

"(*c*) (In a large number of cases) The companies have been losing money since 1929 and yet the stockholders have been drawing out dividends or partners paying themselves the same salaries that they received during the prosperous period.

"(*d*) In many cases the companies or partnerships started their business career without sufficient capital and relied entirely upon their creditors to furnish their working capital.

"Also

"(*e*) It is surprising to see such a large number of companies making application which are unable to furnish sufficient information and audited statements with which the proper information can be secured.

"(*f*) Many cases show that the applicant has frozen his working capital by selling to poor credit risks or overbought his merchandise requirements and today his working capital is tied up in unsalable inventory and uncollectible accounts receivable.

No Government Loans to Promote Incapacity

"The applications show very clearly that the conditions in which the companies are today were brought about very largely by the following reasons:

"(1) Excessive speculation in real estate, stock market and inventory.

"(2) That business men did not seem to realize that prosperity could not last forever and went ahead granting credit recklessly, drawing out salaries and other personal remuneration without due regard to the earnings.

"(3) Failure to give their undivided attention to their own business affairs.

"The problem before us today as I see it is, 'Will business men profit by the mistakes they made in 1928, '29 and '30 and get back to fundamental principles that prevailed in the pre-war days?' I am sure that as soon as business men realize that there is no short cut to success, but that the road leads over rough spots which means hard work, then, and not until then, will we find our way out of the mirage into which we have been led. As credit men we should never overlook the fundamentals taught us many years ago, that in granting credit, extending loans, etc., we must never forget the three C's: Capital, Capacity, and Character. I believe you all can assist in the work which the Federal Reserve Bank is endeavoring to accomplish, by referring to it your debtors who already have capacity and character but who need working capital."

More Business and Less Speculation

Everything one reads from the "big shots" at Washington tends to confirm the impression that while there is no intention of eradicating legitimate profits from production and service industries, they do aim to eliminate speculative profits so far as possible. That there were many corporation abuses in the past is proved by recent recommendations of the American Institute of Accountants regarding practices that should no longer be permitted.

The recommendations follow:

(1) Unrealized profits should not be credited to income account of the corporation either directly or indirectly, through the medium of charging against such unrealized profits amounts which would ordinarily fail to be charged against income account.

(2) Capital surplus, however created, should not be used to relieve the income account of the current or future years of charges which would otherwise fail to be made thereagainst.

(3) Earned surplus of a subsidiary created prior to acquisition does not form a part of consolidated earned surplus of the parent company and subsidiaries, nor can any dividend declared out of such surplus properly be credited to the income account of the parent company.

(4) While it is perhaps in some circumstances permissible to show stock of a corportion held in its own treasury as an asset, if adequately disclosed, the dividends on stock so held should not be treated as a credit to the income account of the company.

(5) Notes or accounts receivable due from officers, employes, or affiliated companies must be shown separately and not included under a general heading such as notes receivable or accounts receivable.

Future of NRA

Little news comes from NRA headquarters since the exit of Gen. Hugh S. Johnson, but all indications are that a lot of work is being done and definite policies are being shaped. It is now said that numerous code enforcement cases will be brought to a head as fast as possible for the purpose of finding out what parts of the codes will stand the tests of the courts. At Boston, Mass., recently, Donald R. Richberg said, "NRA codes are continually in the process of modification, and at present the effort is being made to get them as far as possible on a voluntary rather than a compulsory basis."

The issue before NRA of solving *the key problem* of all industries—elimination of destructive price-cutting—is well illustrated by the lumber industry, which has many points of similarity to the rock products industry. A showdown on price-fixing is imminent as a result of the filing with the Lumber Code Authority of a resolution voted 14 to 7 by the West Coast Lumber Code Authority demanding cancellation of all minimum prices. The Lumber Code Authority had previously voted 34 to 1 for continuation of cost protection prices. While the decision must await determination of the attitude of the other regional lumber code authorities, high NRA officials are known to regard the lumber industry as one of the best examples of the failure of price-fixing. In the industry there is a widespread discontent over "chiseling" of minimum prices, which, some companies assert, has so unsettled the market that no buyer will pay the code minimum prices without putting up a fight. Attempts to enforce code minimums in the courts have met with varying decisions in different parts of the country. Genesis of the trouble, some lumbermen maintain, was the fixing of code minimums at levels which proved attractive to owners of small mills and woodlots throughout the country, with the result, it is estimated, that 3,000 of them started up anew.

Exemption from Anti-Trust Laws Not the Answer

Every member of a trade association has probably heard it stated many times over, in the past, "if only the anti-trust laws were repealed or modified, and we could make voluntary agreements on price and production control, the troubles of our industries would be over." This may be true in the cases of some industries which have relatively few, and those few mostly large, producers. But it will not work in such an industry as sand and gravel, or crushed stone production any better than in the lumber industry, and here is how it has worked in that industry according to A. W. Clapp, of the Weyerhauser companies, probably the largest interest in the lumber industry:

"A great deal has been said about enforcement and lack of enforcement and a great deal of criticism has been leveled at the NRA. I should like to make a distinction between compliance and enforcement. Compliance connotes voluntary coöperation. In this, with respect to price maintenance, our industry has signally failed. My own personal belief is that lack of enforcement has had very little to do with this. At any rate, we were allowed to have a code under which the industry itself was for the first ten months permitted to fix its own minimum prices. We had always said that if our industry could be freed from the restrictions of the anti-trust laws and permitted to make fair voluntary agreements we could rescue it from the depths to which it had sunk. I think it has been fairly well proven that this is not true."

No Substitute for Intelligent Self-Interest

So, the primary sore all the NRA codes were designed to cure still exists in many industries; in others with larger units and more intelligent managements the codes have undoubtedly been a great help to recovery. Of course, this doesn't tell anything not previously known to any observer of business and human character; there is no substitute for intelligent self-interest; if an industry does not have it collectively and individually, in a large majority, NRA codes or any other device will not help it survive. Therefore, there is every reason to believe that all attempts at price-fixing in codes will soon have to be abandoned. Mr. Richberg said in New York, recently, "a democratic people will not tolerate the idea of price-fixing by private agreement. They will insist on either stopping the system or placing it under public control." Price-fixing by private agreement always has been done to some extent, as probably Mr. Richberg knows, but with all of the Government's present contacts with business, it will not be so feasible as in the past; so that unless an industry wants the price of its product set by Government, it must arrive at fair prices through the use of intelligent self-interest—and we are right back where we started from, although presumably the wiser for our experimenting.

Essentials of Future NRA Program

Donald R. Richberg, speaking before the annual convention of the Association of Grocery Manufacturers of America, presented four planks which he believes will be comprised in the permanent NRA organization. These included:

(1) Fixing of minimum wages and maximum hours.

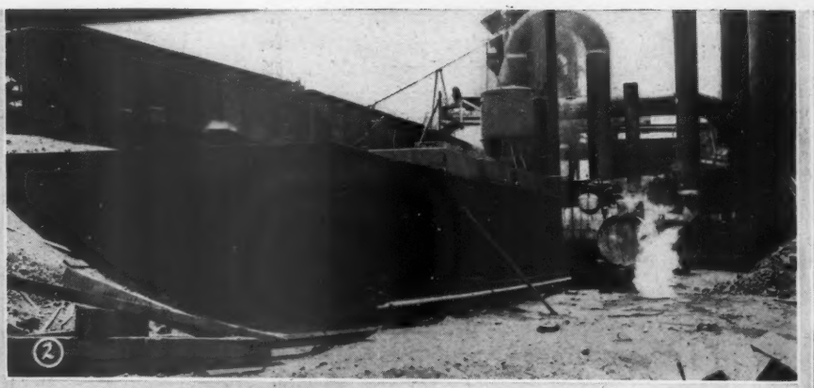
(2) Elimination of dishonest business practices.

(3) Exact reports of production, prices, wages, employment and general economic conditions.

(4) Freedom of agreement between employers and employes.

Jobs Instead of Doles

After experimenting with direct relief and with jobs under PWA and CCC, both the relief administration and the others are reported to be much in favor of providing jobs rather than relief, although the job method will require a greater present outlay of money. Whether or not the jobs are supplied directly by Government in producing various commodities, or by private industry fulfilling government contracts, depends pretty much on how alive industry is to its opportunity. It is not necessarily a responsibility of organized industry, it is just as much a responsibility of *every* single employer, to see that the Government makes good its pledge to give private industry the first chance. Everything points to a large public works and housing program, so that it is the construction industry and the construction materials industries that must do the most—not merely by employing more labor themselves, but by placing orders for new machinery and equipment now whenever it is needed; and thus take up some of the unemployment in these capital goods industries.



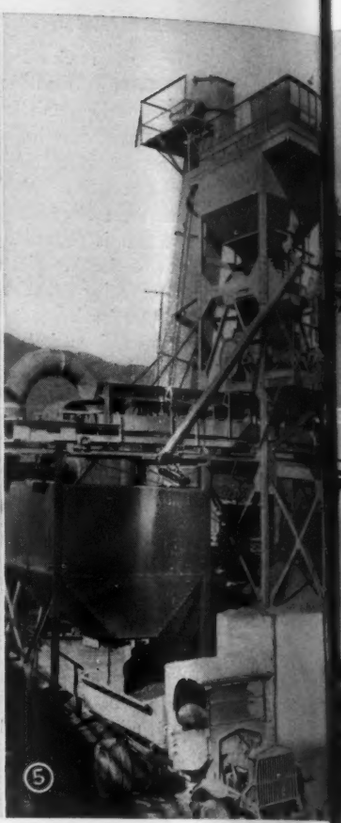


Illustration 1—Trestle conveyor used by Basalt Rock Co. across Russian River at Pieta, Calif. 2—Oil and asphalt storage tanks. 3—Texture of finished road (cutback asphalt plant mix) on Cloverdale-Hopland highway. 4—Two finishers on Cloverdale-Hopland highway. 5—General view of asphalt plant. Note absence of shafting and long chains. Each unit has its own individual motor drive

Hurry-Up Order for Cold Asphalt Mix Le

Basalt Rock Co., California, Overcomes Numerous Difficulties

By F. L. Swinson,
Basalt Rock Co., Napa, Calif.

PRODUCTION of cold plant mixes has become a very definite part of the gravel, rock and sand industry. Governmental recognition of this fact has become evident in the action of the Code Authority at Washington in designating the business of cold-mix manufacture as a division of the Crushed Stone, Sand, Gravel and Slag Industries.

The cold mix plant's place as an important adjunct to an aggregate plant is exemplified by the investment recently made by Basalt Rock Co., Inc., in a large capacity black mix plant located at Bailache, the site of the company's sand and gravel operation on the banks of the Russian river near Healdsburg, Calif.

Built for Specific Job

This black plant was constructed primarily to produce 33,000 tons of bituminous treated surfacing placed on 13 miles of new highway between Cloverdale and Hopland on the famous Redwood highway.

Following the completion of this job, the plant is taking its place in the regular production scheme of the company, making cold mixes for construction and maintenance which are shipped by both rail and truck.

The contract for the placing of the surfacing on the Cloverdale-Hopland section was secured by Peninsula Paving Co., San Francisco, which, in turn, placed its order for the mixed material with Basalt Rock Co. The time limit for completion was set at 80 days after award of the contract, with a penalty of $100 per day for failure to complete it within the specified time.

Installed and Operating in a Short Time

Inasmuch as Basalt Rock Co. desired to install a permanent plant set-up, the task of completion within 80 days was a tremendous one. Following the award of the contract, an order was placed with Standard Steel Co., Los Angeles, for a complete plant of 3000 lb. mixer capacity. Meantime work was being rushed on the 650-cu. yd. concrete bunker from which the black-top plant would be fed.

The plant was completed and after a few days got into its production stride. Shipments were begun to Preston over the rails of the Northwestern Pacific Railroad at the average rate of 20 cars of 60 tons each per day. Here Peninsula Paving Co. unloaded with a 1½-cu. yd. Northwest crane.

Special Unloading Facilities

The next set-up was at Pieta, midway on the job. Here a nice little problem presented itself. A little-used passing track gave all the trackage desired. From this point all the balance of the material for the job could be economically hauled. The only fly in the ointment was that the road was on one side of the Russian river and the spur track was atop a high bank on the other side with no bridge connecting and the water too deep for fording.

The problem was solved by installing a steel hopper between the rails into which center-dump cars could be unloaded. From the hopper a 24-in. belt conveyor was carried on a wood-framed trestle across the

6—Conveyor for fine asphalt sand. Trucks dump into hopper from ramp, left. Variable speed on conveyor regulates feed. Blower for cyclone dust collector in right background. 7—Vibrating feeders under fine size bins, putting even feed on conveyor feeding asphalt plant. 8—650-cubic yard concrete bunker. Black plant, right, is fed from this bunker. 9—Unloading cars at Pieta. 10—Conveyor across the Russian River at Pieta

ix Led to Permanent Plant—and Business

river to the location of a truck bunker unit.

Some 22,000 tons were unloaded at this point at the average rate of 1200 tons per day, although for a time operations were slowed up by a tendency of the black mix to stick and bridge over in the cars, due, probably, to the use of E grade asphalt, using only 11% kerosene solvent. Much of this solvent was "fried-out" in the mixer because the rock was hotter than is usual in cut-back mixing. The difficulty in unloading was overcome by bringing in a small compressor and two jack hammers which, applied to the outside of the steel cars, quickly jarred the material loose.

The surfacing was delivered to the road by a fleet of six-wheel Brockway trucks which dumped through two Hembell "Spreadmix" finishers. Additional leveling with a pneumatic-tired motor patrol and rolling with 8-ton tandem rollers completed the surface.

Compact and Complete Mixing Plant

The compactness and completeness of the asphalt plant at Bailache should appeal to the aggregate plant operator interested in the production of cold mixes.

Aggregates at Bailache are stored on the ground over concrete tunnels. From the main storage, materials are moved by conveyor belt to the concrete bunker. This bunker has 10 compartments of 65 cu. yd. capacity each.

There are two bin gates under each bunker section. Under one set of gates is a 24-in. conveyor belt, which discharges directly into the black-top plant dryer. The other set of bin gates is used for loading trucks and, by means of a Fairbanks Morse traveling weigh batcher equipped with a dial scale, bulk materials are weighed, batch trucks are loaded and the fleet of Jaeger concrete mixer trucks operated by Basalt Rock Co. are charged. Under this arrangement, the black-top plant can be fed, trucks can be loaded with aggregates and mixer trucks charged simultaneously from the one set of bunkers without interference of one operation with the other.

Uniform Feeding of Fine Aggregates of Prime Importance

Uniform or even feeding of fine aggregates has always been a bug-bear in black-top plant operation. In this case the difficulty has been entirely solved by the installation of two Jeffrey-Traylor vibrating feeders under the fine-size bins. These feeders place a uniform feed of any desired quantity on the belt; and, through the ability to open the bin gates wide, and the vibration which is transmitted through the materials in the bin, all tendency to stick is overcome, even in the case of damp rock dust.

From the storage bunker, material is discharged direct to the feed end of a dryer 24 ft. long by 60 in. diameter. This dryer is driven by a 25-hp. Fairbanks-Morse motor through a Falk gear reducer and Link-Belt chain to a ring gear and pinion final drive. Due to the damp materials encountered during forced production on the Cloverdale-Hopland job, two steam burners of large size were installed. The dryer demonstrated the ability to dry aggregate of 8% average moisture to less than 1% moisture at the rate of 120 tons per hour. Fuel consumption amounted to 252 gal. per hour under these conditions. For ordinary day-to-day production, only one burner is used with a decrease of about 40% in oil consumption.

Asphalt sand at Bailache is dug from a dry pit by a ⅜-cu. yd. gasoline-powered shovel. The dry sand is hauled by truck to a hopper near the concrete bunker. From the hopper an 18-in. belt carries the sand to the feed end of the dryer where it enters the

dryer along with the feed from the bunker. In the bottom of the hopper is an opening 5 in. wide by 36 in. long. This opening is constant assuring a full and uniform feed on the belt in spite of the sticking tendency of fine sand. Variation in sand feed to the dryer is secured through driving the feed belt with a variable speed motor giving any desired speed between 100 and 200 ft. per min.

Sizing Dried Rock

The rock discharged from the dryer is carried on an enclosed vertical bucket elevator to the top of the plant where it is sized on a double-deck Symons vibrating screen 4 ft. by 10 ft. in size.

The plant is complete with four bins, the double-deck screen splitting the aggregate into four sizes, which stored in four bins, are weighed into the mixer by four weigh hoppers. Specifications of the California Division of Highways covering production of bituminous treated surfacing, however, call for splitting the aggregate into only two sizes, minus 3-mesh and 3-mesh to 1-in. To speed up production on the Cloverdale-Hopland job, two of the bin partitions were removed as well as two of the screen sections. Using the four bins and their accompanying screens, the plant is qualified to produce the best types of asphaltic concrete.

Mounted beneath the mixer is a shuttle conveyor carrying a 36-in. belt, which discharges the mixed materials into cars. This belt installation was designed to carry away the mixed material as fast as it can be discharged from the bottom of the mixer. Changing the position of the shuttle conveyor and reversing the direction of the belt discharges the mixed material to trucks.

Dust Collector Saves Fines—For Use

The plant is equipped with a dust collector system shown in the picture (page 27). This was installed for the protection of neighboring orchards and also for saving and putting back into the mix the valuable fines which would otherwise be lost through the stack. The dust collector fan is a size 50-E, manufactured by American Blower Corp., and is driven by a 30-hp. motor direct connected.

A metal housing covering the screens forms the top of the plant. Lifting of this housing enables the plant operators to change or inspect the screens without getting into the dust of the screening house. The screens are driven by a 5-hp. motor with "Tex-rope" drive, the motor being located outside the screen house to keep it out of the dust.

The 3000-lb. Standard mixer is driven by a 75-hp. motor through a chain drive. No clutch is used, the mixer being started and stopped through the motor control.

Accessory Equipment

Storage for fuel and mixing oils is provided by six steel rectangular tanks having a capacity of 9500 gal. each. These tanks, to expedite heating, are liberally supplied with 2-in. welded coils, steam being supplied by a 35-hp. Scotch marine dry back boiler. All oil and asphalt pipe lines are steam jacketed.

Oil for burning is pumped by a duplex steam pump set, while oils and asphalts for mixing are handled by a Viking pump with a 10-hp. motor.

To fit the varying requirements of commercial trade, it is planned to have available at all times 60-70 and 70-80 road oils, 90-95 and E grade cut-back asphalts.

For the use of the black-top plant as well as the aggregate plant, a small but well-equipped laboratory is maintained at Bailache. Equipment includes a mechanical screen shaker, gas flame dryer, moisture determination equipment, sodium hydroxide testing equipment, etc.

Lloyd Smead is superintendent of the Bailache plant, Louis Cassayre is general superintendent, the author is sales manager and A. G. Streblow is president and general manager of Basalt Rock Co., Inc.

The company also operates another cold mix plant at Rocktram, near Napa, Calif., where the company's quarries for the production of crushed stone and rip-rap are located.

Code Developments

PROPOSALS for basic revision of NRA compliance and enforcement methods have been made to the National Industrial Recovery Board by William H. Davis, former director of compliance, who was persuaded to return on a part-time basis as special adviser on compliance and enforcement problems.

Mr. Davis proposes separation of trade practice provisions of codes into three classes:

(1) Those which by public acceptance, industry practice and court decisions have already become established, such as prohibitions of misrepresentation, bribery, hidden rebates, etc. These should be enforced directly in the courts.

(2) Those which prohibit practices not commonly established and recognized as unfair, or on which there is neither common agreement nor court precedent. They should not be so enforced as to arrest public support of the code program until and unless their merit and public acceptance is developed, and their legal and economic justification is established by the Federal Trade Commission or court decisions.

(3) Those which experience has shown to be unenforceable or economically unwise. They should be dropped by code revision.

It is Mr. Davis' conception that all Class (2) provisions would gradually pass into either Class (1) or Class (3), but he did not undertake to specify which groups of code provisions now fall into Classes (2) and (3). He will soon begin a study of specific code groups.

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Crushed Stone, Sand and Gravel, and Slag Industries: Establishment of seven "permissive areas" in Ohio, in which no new plant capacity may be established until June 15, 1935, except by permission of the State Committee, is announced. The order restricts new sand and gravel capacity in some of the areas, and new crushed stone installations in others. It was effective November 29.

The areas designated are as follows: No. 1, Hamilton and Clermont Counties; No. 2, Preble County; No. 3, Warren County; No. 4, Fayette, Highland and Clinton Counties and parts of Ross County and Greene County; No. 6, Scioto County; No. 7, the eastern portion of Ross County; No. 9, Auglaize, Allen and Mercer Counties.

The restriction applies only to crushed stone capacity in Clermont County, Fayette County and Allen County, and only to sand and gravel capacity in Hamilton County, Warren County, Scioto County, and Area No. 7.

All cases in which application for new capacity is made to the State Committee must be reported to the National Industrial Recovery Board, whether the applications are granted or not. The Committee is also required to furnish current statistics of average selling prices, hourly wages for common labor, man-hours employed and tons produced, and the same information for 1933 and 1934, that report to be furnished before April 1, 1935.

Contractor-producers who obtain sand, gravel or stone for public highways from publicly-owned or controlled lands have been granted a 90-day exemption from the code for the crushed stone, sand and gravel, and slag industries. "Contractor-producers" are contractors who both produce and apply highway materials. The exemption was requested by the Bureau of Public Roads to eliminate misunderstandings and difficulties which had arisen in determining whether these contractors are under the code for the crushed stone, sand and gravel, and slag industries. Most of them operate under the construction industry's code. The exemption, the Bureau of Public Roads informed NRA, "will greatly facilitate advertisement and award of road projects throughout the whole country." A public hearing will be held within the 90-day period to discuss the question and to reach a final settlement of the problem. Contractor-producers under the exemption must observe the hour and wage provisions of the code for the crushed stone, sand and gravel, and slag industries if they are superior in particular cases to those of the construction industry's code. Other code

provisions had brought about the misunderstandings responsible for the exemption order.

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Lime Industry: Plan of procedure and a national and 12 local trade practice complaints committees for the lime industry have been recognized by the National Industrial Recovery Board. Membership of the national committee follows: B. L. McNulty, Marblehead Lime Co., Chicago, Ill.; J. M. Gager, Gager Lime Manufacturing Co., Chattanooga, Tenn.; J. M. Deely, Lee Lime Corporation, Lee, Mass.; Reed C. Bye, Warner Company, Philadelphia, Penn.; G. J. Whelan, Kelley Island Lime and Transport Co., Cleveland, Ohio; Col. A. C. Voris, U. S. War Department, Washington, D. C.

Membership of the local committees follow:

District No. 1—George B. Wood, chairman, Rockland & Rockport Lime Corp., Rockland, Me.; E. A. Gallagher, United States Gypsum Co., New York, N. Y.; Leo F. Wilson, Fonda Lime Kilns, St. Albans, Vt.

District Nos. 2-3.—Reed C. Bye, chairman, Warner Co., Philadelphia, Penn.; Philip L. Corson, G. & W. H. Corson, Inc., Plymouth Meeting, Penn.; J. P. Feiser, LeGore Lime Co., LeGore, Md.; Harry G. Hoehler, Universal Gypsum & Lime Co., York, Penn.; A. B. Mack, Kelley Island Lime & Transport Co., Cleveland, Ohio; E. C. Mathias, Washington Building Lime Co., Baltimore, Md.; Ray C. Noll, Whiterock Quarries, Inc., Bellefonte, Penn.; S. W. Stauffer, J. E. Baker Co., York, Penn.; Robert S. Walker, Chemical Lime Co., Bellefonte, Penn.; E. D. Williams, H. E. Millard, Annville, Penn.; Franklin S. Lee, secretary, Room 1002, 1420 Walnut St., Philadelphia, Penn.

District No. 4.—James H. McNamara, chairman, Eagle Rock Lime Co., Eagle Rock, Va.; A. C. Carson, Riverton Lime Co., Riverton, Va.; S. C. Snead, Kimbalton Lime Co., Shawsville, Va.; J. A. Dunaway, alternate, Peery Lime Co., North Tazewell, Va.; H. S. Covert, secretary, Arnold Hotel, Knoxville, Tenn.

District No. 5-*A*.—G. J. Whelan, chairman, Kelley Island Lime & Transport Co., Cleveland, Ohio; M. H. Baker, National Gypsum Co., Buffalo, N. Y.; G. H. Faist, Gibsonburg Lime Products Co., Gibsonburg, Ohio; C. F. Henning, United States Gypsum Co, Chicago, Ill.; J. Del Miller, Herzog Lime & Stone Co., Forest, Ohio; E. C. Mathias, Washington Building Lime Co., Baltimore, Md.; R. G. Spencer, National Lime & Stone Co., Findlay, Ohio; W. F. Stolzenbach, National Mortar & Supply Co., Pittsburgh, Penn.; J. J. Urschel, Woodville Lime Products Co., Toledo, Ohio; Fred Witmer, Ohio Hydrate & Supply Co., Woodville, Ohio; L. E. Johnson, secretary, 508 Home Bank Building, Toledo, Ohio.

District No. 5-*B*.—Russell Rarey, chairman, Marble Cliff Quarries Co., Columbus, Ohio; Carter N. Abel, Ohio Calcium Co., Pedro, Ohio; C. P. Elgin, Adam Realty Co., Cedarville, Ohio; D. H. Jenkins, John W. Jenkins & Son, Springfield, Ohio; A. B. Mack, Kelley Island Lime & Transport Co., Cleveland, Ohio; W. H. Moores, Moores Lime Co., Springfield, Ohio; W. A. Reaney, Scioto Lime & Stone Co., Delaware, Ohio; W. F. Stolzenbach, National Mortar & Supply Co., Pittsburgh, Penn.; L. E. Johnson, secretary, 508 Home Bank Building, Toledo, Ohio.

District Nos. 6 and 8.—Gordon W. Hughes, chairman, Inland Lime & Stone Co., Manistique, Mich.; V. F. Nast, Western Lime & Cement Co., Milwaukee, Wis.; E. P. Smith, Limestone Products Co., Menominee, Mich.; K. C. Ruedebusch, Mayville White Lime Works, Mayville, Wis.; E. J. Groth, John F. Groth & Sons, Cedarburg, Wis.; W. F. Kerwin, secretary, 604 Bellin Building, Green Bay, Wis.

District Nos. 7 and 12.—G. H. F. Johannes, chairman, Glencoe Lime & Cement Co., St. Louis, Mo.; V. Q. Blumenberg, Ozark White Lime Co., Fayetteville, Ark.; D. S. Hunkins, Peerless White Lime Co., St. Louis, Mo.; W. J. Stewart, Marblehead Lime Co., Kansas City, Mo.; H. L. Vernia, Hoosier Lime Co., Salem, Ind.

District No. 9.—Henry La Liberte, Cutler-Magner Company, Duluth, Minn.; A. M. Lanphere, Black Hills Marble Quarries Corp., Rapid City, S. D.; B. F. Pay, Fowler & Pay, Mankato, Minn.

District Nos. 10 *and* 11.—W. M. Palmer, chairman, Dixie Lime Products Co., Ocala, Fla.; Gadsden Smith, Southern States Lime Corp., Charleston, S. C.; W. V. Hammond, Keystone Lime Works, Inc., Keystone, Ala.; H. S. Covert, secretary, Arnold Hotel, Knoxville, Tenn.

District No. 13.—John H. Chiles, Sr., chairman, Austin White Lime Co., Austin, Tex.; E. J. Walsh, Round Rock White Lime Co., Round Rock, Tex.; Cecil R. Haden, secretary, Haden Lime Co., Houston, Tex.

District No. 14.—John S. McMillin, Roche Harbor Lime & Cement Co., Roche Harbor, Wash.; J. H. Evans, Idaho Lime Co., Bossburg, Wash.; Charles G. Huber, Lively Lime Products Co., Gold Hill, Ore.

District No. 15.—R. L. Tremoureux, chairman, United States Lime Products Corp., San Francisco, Calif.; H. P. Brown, Diamond Springs Lime Co., San Francisco, Calif.; E. L. Coppock, The Utah Lime & Stone Co., Salt Lake City, Utah.; Donald Fragner, Grand Canyon Lime & Cement Co., Los Angeles, Calif.; J. M. Garoutte, Paul Lime Plant, Douglas, Ariz.; R. B. Mitchell, Henry Cowell Lime & Cement Co., San Francisco, Calif.; R. J. Shirm, Holmes Lime & Cement Co., San Francisco, Calif.; P. C. Thomson, Oro Grande Lime & Stone Co., Beverly Hills, Calif.; J. A. Bernhard, secretary, California Chemical Corp., San Francisco, Calif.

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Builders' Supply Industry: President Roosevelt has approved a new Code to supersede the Code which has been in operation since October 13, 1933. The new Code became effective November 4. It creates coördination boards to attempt adjustment of jurisdictional disputes. Many complaints had been received from groups outside the trade, principally manufacturers and producers of builders' supplies, of overlapping between this and other Codes. It is expected that the coördination boards, jointly designated by the objector and the Code Authority and with an impartial member, will contribute to solving this problem.

A provision for a liquidated damages agreement is also included, under which members of the trade may agree to pay certain predetermined amounts into the Code Authority treasury if they are adjudged guilty of Code violations.

A prohibition of destructive price cutting, permission for the Administrator to declare an emergency if price cutting endangers the Code's operation, and to establish minimum prices during such an emergency is substituted for the system of modal markups, which expired November 1.

Compliance with appropriate Codes is required of both suppliers and purchasers—no member of the trade may purchase from a manufacturer or producer or sell to a contractor or other consumer who does not certify that he is complying with his appropriate approved Code.

Other trade practice rules are not materially changed from the old Code. They prohibit secret rebates, unearned discounts, defamation of competitors, misbranding, commercial bribery, selling below cost, and lump-sum bidding.

No change is made in the labor provisions except to bring watchmen under the minimum wage rate for other employes, which is 25 to 50 cents an hour, depending on region and population. Working time of watchmen, formerly unregulated, is now limited to 13 days out of 14. The basic maximum work-week remains unchanged at 40 hours, with exceptions for executives, dealers in small towns, and yard foremen, truck drivers, and helpers. Administration of the Code is not changed.

Further Code News

RULINGS and interpretations bearing on code administration for the concrete masonry, concrete pipe and ready-mixed concrete industry are published on page 55 of this issue. On page 32 is a summary of a code ruling involving slate producers.

British Gypsum Wallboard Plant With Latest American Equipment

Left: View of cutter, roll tipple, pre-cooling section and enclosed section of dryer in new plant of Gyproc Products, Ltd., in Rochester, Kent, England. Right: Automatic transfer and tipple

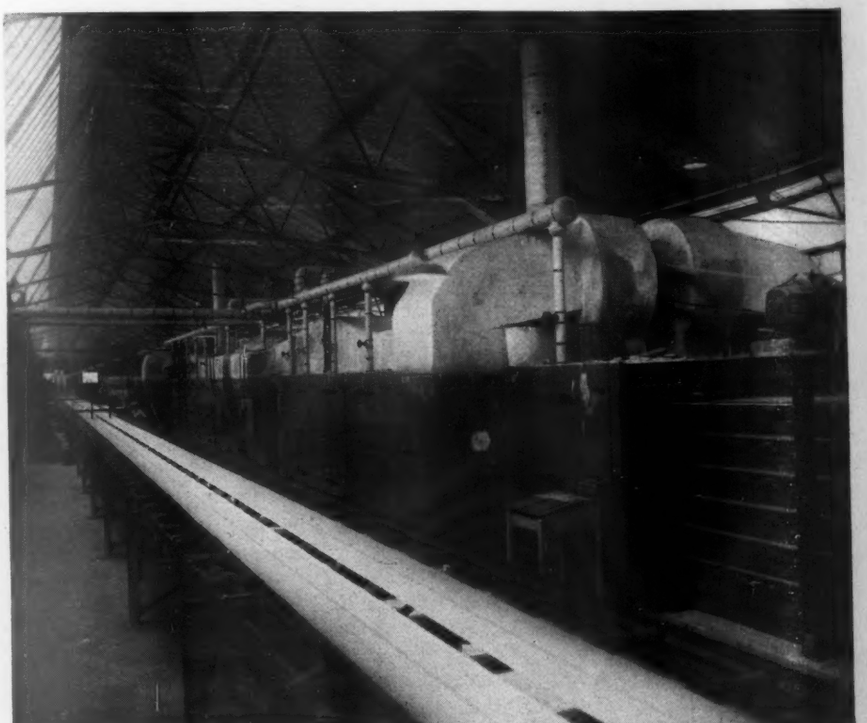
THE American method of manufacturing gypsum wallboard has now spread to England and the opening of the new Gyproc Products, Ltd., plant in Rochester, Kent, undoubtedly marks a new era in the manufacture of building materials in England.

The history behind this plant is of interest. In their search for new markets the progressive Gypsum Lime and Alabastine (Canada) Ltd., established an agency agreement in England with Honeywell and Stein, Ltd., for the sale of their products. To assist the English company, one of their best salesmen, R. S. Wright, was sent to England. The success of this venture was so great and the sales of Canadian board so large that it soon became apparent that a very profitable wallboard business could be established by manufacturing in England.

An arrangement was, therefore, made between the English representative, Honeywell and Stein, and the Canadian company, making them partners in the new venture and a new company was formed with R. H. Stein, the managing director of Honeywell and Stein, in the position of the managing director for the new company, Gyproc Products, Ltd. The United States Machinery Co., 115 Broad St., New York City, was retained as consulting engineer, and with the coöperation of the chief engineer of the Canadian company, L. V. Robinson, plans and details were drawn up. J. F. Strable of the Canadian company's Montreal plant was retained as production manager for the new mill.

One of the conditions of the contract was that 90% of the machinery and equipment should be built in England and it can, therefore, be said that this factory is truly British made and British operated. Ground was broken for the new mill before Christmas, 1933, and the mill was put into operation in the beginning of June, 1934.

The site at Rochester, Kent, was chosen with a great deal of care and foresight by the directors of Gyproc Products, Ltd. The new mill has a very excellent communication with its source of raw material and its market by water, rail, and road. Lying as it does on the edge of the Medway, which connects with the Thames, large steamers can land at its dock to unload raw material or to load the finished product. There are also communications with its dock by means of barges to the Continent or to various parts of the United Kingdom for the finished



Dryer and setting belt table in new English wallboard plant

product. The mill also lies within a short distance of the Rochester station on the Southern railroad and is connected to this railroad by its own branch line, thus connecting it with the heart of London by rail in approximately 30 minutes. It also lies a short distance from one of the main roads south of London, and it is possible to get the finished product into the largest English market center in from 30 to 40 minutes by motor truck.

For power the new mill depends on the English Central Net, and has its own transformer station, where it transforms 3000 volts down to 440 volts, 50-cycle, 3-phase for use in the mill itself.

The mill also generates its own steam, using a Babcock and Wilcox water-tube boiler of about 2000 sq. ft. heating surface, with a pressure up to 180 lb. per sq. in. The fuel used is British coal taken to the boiler plant by a chain-grate stoker.

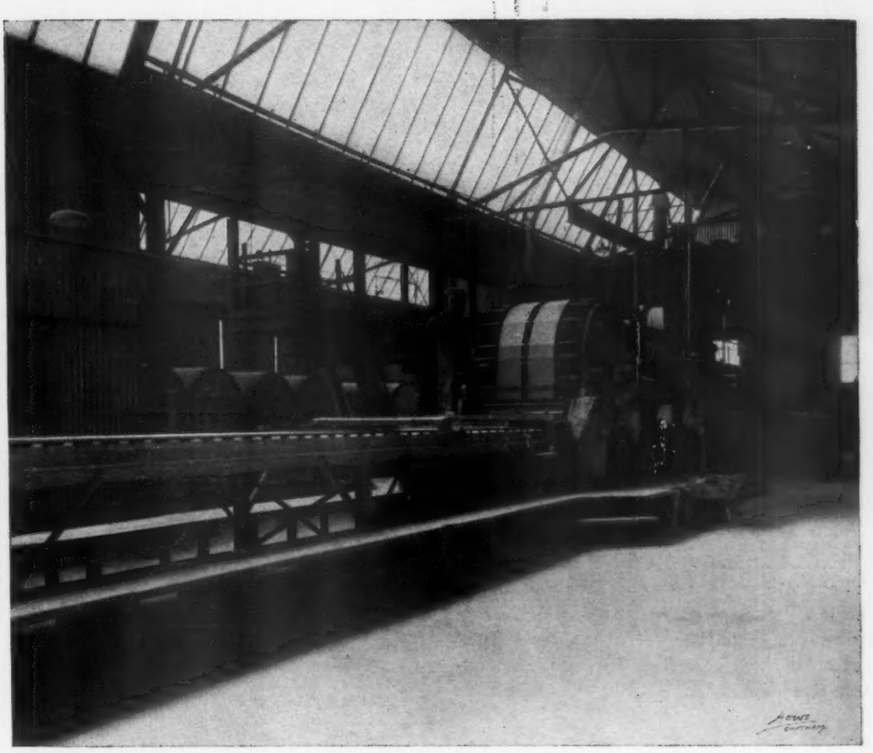
The wallboard building is of steel and galvanized sheet iron construction, since the climate is quite mild and the main requirements are protection from the elements. Incorporated in the building itself is storage space where practically one million square feet of board can be stored, so, if desired, the mill can carry this quantity in Rochester stock.

Raw material enters the mill in the form of calcined plaster, being imported for the purpose. There is a storage space for approximately 300 tons of such calcined plaster, which is distributed to the mill from this storage. Arrangements have been made to draw off this plaster mixed with necessary retarder and hair in a Broughton mixer, and to bag it on the premises for sale as bagged plaster.

Plaster for the manufacture of wallboard is taken to a secondary bin which is used as an intermediate storage space. From this bin it is fed to the soak belt. A specially designed paste feed hopper, on which the objectionable features of most such hoppers have been eliminated, feeds starch and retarder to the plaster on its way to the soak belt. A screw conveyor is used to mix this starch and retarder with the plaster on its way.

The soak belt is of conventional design consisting of a trough in which the water is held at constant level by special controls through which the soak belt travels, the plaster being spread by means of a spiral roll.

After passing through the soak belt the material is fed into a special mixer, which is conical in shape. The mixing is done by means of a propeller at the bottom of the apparatus, a special scraper being used to prevent the setting or adhesion of the plaster to the sides of the mixer. From the mixer the plaster is sent to the forming table. During the mixing a special foam preparation is added to the plaster by using a patented process to get a lighter and stronger board than would result according to more conventional methods.



Above: Forming machine and paper feeders in plant of Gyproc Products, Ltd. Below: Dry end of dryer. Note lath emerging and being removed by electric truck

On the forming machine the top and bottom paper racks are essentially the same, consisting of structural steel framework and capable of holding two rolls of paper on each. Mounted on these are special tight-

eners and straighteners to feed the paper exactly right. Heaters are also provided to heat up the edges of the paper before folding. Scoring stones and conventional edge folding apparatus are used. The table itself is made of brass and the squeeze rolls are cast iron turned and ground.

Three belt forming tables are used, each 100 ft. long. There is no iron belt. A new system of drive for these tables was worked out by the United States Machinery Co., using three special a.-c. motors, synchronized together, driving direct to the table by means of speed reducers. This type of drive has been found to be not only more convenient but more accurate, and uses less power, as well as removing the unsightliness and difficulties generally met with in using a long shaft.

The cutter is of the standard Knowlton type and is also driven through the synchronized drive which controls the table. The speed rolls following the cutter are made of brass to prevent scuffing the boards when changing speed. The transfer is fully automatic, and according to the most modern Coe design. It is built to handle lath, and the standard sizes of wallboard, entirely automatically through the use of special controls, brakes, and switches.

The feeding tipple is of standard Coe design in accordance with the latest practice, feeding the six decks of the dryer automatically. The dryer itself is 10 ft. 6 in. wide inside and of the double air system type. It is equipped with a special precooling section giving the boards more setting time before entering the dryer. The dryer itself is 105 ft. long in the enclosed section and its capacity up to at least 120,000 sq. ft. in 24 hours. When running at the rated capacity of the mill, that is, 80,000 sq. ft. per day, only 80 lb. steam pressure is used at the wet end and 25 lb. steam pressure at the dry end. The dryer is equipped with an automatic unloader for convenience in taking out the board.

The success of this new plant in England, built along the most modern lines, will undoubtedly be the means of stimulating the gypsum wallboard business throughout the world, since it successfully demonstrates that this American type of building material can be successfully marketed in other countries under preferable sales direction, and that plants abroad employing American machinery and methods are successful under capable management.

It is interesting to note that the United States Machinery Co., Inc., contracted to build this factory complete and assist in putting it in operation. They also furnished the machines both from England and America necessary to make it complete.

Code Ruling

Slate Industry: Industrial Appeals Board has affirmed denial of application for exemption from minimum wage provisions of the slate code. The Pitts Slate Corp., the Williams Slate Co., the Arvonia-Buckingham Slate Co., and the LeSueur-Richmond Slate Corp., all of Virginia, appealed from an administrative interpretation of "quarrying" including them in its scope, and from orders denying previously requested exemptions from wage provisions of the slate code. Appellants argued their operations were not within scope of the code unless they were engaged both in "quarrying" and "selling" slate. This was over-ruled by the Board and administrative action was upheld. The Board declared that NRA policy "contemplates employment in general under good conditions of wages and hours; not employment in any particular plant or place under sub-normal working conditions."

FACTS—It appearing that members of the slate industry customarily sell slate to each other to fill orders for special colors or sizes and publish special discounts for such sales which are generally lower than that allowed to the distributor or dealer.

QUESTION—Are such members "commercial buyers" as that term is used in Administrative Order X-48, and may such prices in consequence be granted to Government agencies?

INTERPRETATION — Such members purchase slate for resale and are "commercial buyers" within the meaning of Administrative Order X-48, and prices published for intermember sales may be granted to Government agencies.

Portland Cement Association Holds Enthusiastic Meeting

THE Portland Cement Association's annual fall meeting in Chicago, Ill., November 19-21, was universally conceded to be the best in several years. The papers and reports of the various members of the staff covered a wide variety of active promotional projects and much more anticipated. Special stress was laid on the small market field for housing, soil erosion and other work being undertaken by the various agencies of the government.

The directors re-elected Edward J. Mehren president and William M. Kinney as vice-president and secretary. B. F. Affleck, president of the Universal Atlas Cement Co., was re-elected treasurer. The following will serve as directors of the association for terms beginning in 1935:

Charles Boettcher, president Nebraska Cement Co., Denver, Colo.; G. S. Brown, president Alpha Portland Cement Co., Easton, Penn.; C. B. Condon, secretary and general manager Hawkeye Portland Cement Co., Des Moines, Iowa; Charles L. Hogan, president International Cement Corp., New York; John J. Porter, president North American Cement Corp., New York; F. E. Tyler, president Dewey Portland Cement Co, Kansas City, Mo.; John Treanor, president Riverside Cement Co., Los Angeles; Joseph S. Young, president Lehigh Portland Cement Co., Allentown, Penn.; W. A. Davis, vice-president Standard Portland Cement Co., Cleveland, Ohio; J. B. John, president Medusa Portland Cement Co., Cleveland, Ohio; A. P. Meyer, vice-president Green Bag Cement Co. of Pennsylvania, Pittsburgh; A. J. Rooney, vice-president Huron Portland Cement Co., Detroit, Mich.; S. W. Storey, vice-president Trinity Portland Cement Co., Dallas, Tex.; M. Moss Alexander, president Missouri Portland Cement Co., St. Louis, Mo.; M. C. Monday, president Hermitage Portland Cement Co., Knoxville, Tenn.; Blaine S. Smith, president Pennsylvania-Dixie Cement Corp., Nazareth, Penn.; R. S. Weaver, president Allentown Portland Cement Co., Catasauqua, Penn.; Edwin P. Lucas, president Superior Portland Cement Co., Seattle, Wash.

Increased newspaper advertising authorized by the board of directors for 1935 will be used in part, according to President Mehren, to popularize low cost, all-concrete homes. Great economies in the construction of small concrete homes have been made possible through engineering experiments successfully conducted by research engineers of the association, Mr. Mehren said.

Gypsum

United States Gypsum Co., Chicago, Ill., has purchased the Arborite Co., manufacturers of insulating board products with a factory at Lisbon Falls, Maine. According to the company this acquisition is for the purpose of "rounding out national distribution facilities on insulating board products." The Arborite line includes lath and tile. In addition the United States Gypsum Co.'s brands of insulating board products will be furnished from Lisbon Falls.

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Standard Gypsum Co., Long Beach, Calif., has increased its operating staff. The company now manufactures hardwall plaster, fireproof and partition tile and wallboard. Several other gypsum products will be added to the line as soon as the necessary equipment can be installed, according to Jack Hassell, superintendent.

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Universal Gypsum and Lime Co., Chicago, Ill., announces a dealer distribution policy as follows:

(1) We confine our sales to:
   (a) Retail dealers, such dealers being defined in your codes of fair competition.
   (b) Industrial buyers, for use as ingredients for other manufactured products or in processing other industrial material.
(2) Our transactions with contractors are handled either through or with the approval of the retail dealer.
(3) We reserve the privilege of selling in carload quantities to permanent departments of the United States government.

A Progress Report on Magnesia Kiln Lining*

By C. H. Sonntag,

Plant Manager, Lawrence Portland Cement Co., Thomaston, Maine

THE USE of a basic refractory for lining the hot zone of rotary cement kilns has long been in the backs of the minds of cement mill operators. It has remained in the background because so far as the writer knows, all trials of the older forms of truly basic linings resulted in unsatisfactory performance. Yet the idea continues to appeal, because a basic lining is chemically the right thing to use.

The clinker passing through a cement kiln is, of course, highly basic. The older refractories in common use, both fire clay brick and high-alumina brick, when highly heated in contact with clinker behave chemically as acids. A reaction takes place between them that results in the formation of a comparatively fusible slag. Chemically this slag is a salt, in which the lime of the clinker is the base and the silica and alumina of the refractories are acids. The slag is just as truly a salt as the product of the reaction of caustic soda and hydrochloric acid. The only difference is that the latter proceeds readily at ordinary temperature, while something approaching a white heat is needed to bring about the formation of slag.

Fire clay and high-alumina refractories do not of themselves fail because they melt or even appreciably soften at the temperature of a cement kiln. But the behavior of the slag formed in the way just mentioned is another matter. It does melt at kiln temperatures. It forms a layer between the coating and the refractory, and if the temperature is high enough to cause that layer to melt, the coating falls off and the refractory is exposed. Its rapid destruction follows if a new coating is not promptly formed.

There should be no chemical action, with resultant fusible slag formation, between the basic clinker and a basic refractory. Experience shows this to be so in fact, at least in the case of magnesia lining.

Of course, the logical material from which to make a hot zone lining for a cement kiln would be lime, but, unfortunately, no one has succeeded in making bricks of lime that will stand the service. Magnesia is the only commercially available substance that is similar to lime in its properties, and several attempts have been made to use it. Refractory manufacturers have striven to make magnesia brick that would have a reasonable life, and full-scale trials of one make of these have been carried on in this plant for over three years.

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Fig. 1—Lining a kiln with magnesia refractory

Life of First Magnesia Brick Lining

A rather detailed discussion of the subject of kiln linings, and the story of the first magnesia lining used in this mill, were published in Rock Products, November 5, 1932. In looking over that article, it is noted that although the amount of clinker produced was given, little was said as to the actual life of the brick. The story of that lining may be completed by saying that it was fired up on August 3, 1931, and taken out of service June 8, 1932, after a continuous run of 310 days. During this time it made 518,603 bbl. of clinker, and gave a lining cost saving of $5,749.80 as compared to the average cost of previous linings.

These figures should be considered in the light of two facts: First, that the steel separators that were placed between the brick in the radial joints were used in only half of the lining, the half that had no separators being the one that failed; and, second, that the average life of 27 previous linings, all but one of 70% alumina brick, was 54 days. This last statement is made to give an idea of the severity of the service. Most of the earlier linings were 9 in. thick, whereas the thickness of the magnesia lining was only 6 in.

That first lining was never completely cooled off during its entire life. The run, therefore, showed nothing as to the ability of the brick to resist cooling and heating after having been put into service. Such ability is an important factor in the choice of a hot zone refractory.

When this first magnesia lining completed its run another kiln lined with 70% alumina brick was started up, but the performance of its lining was no better than that of earlier ones of the same material. The things learned during the removal of what was left of the magnesia lining were described in detail in the 1932 article to which reference has been made, so that it is unnecessary to discuss them here, but the results amply warranted the installation of another lining of the same type, which was done in the same kiln that had held the first one.

Placing the Second Lining

This second lining was made of the same kind of brick as was used in the first one, and was identical with it in every way except that steel separators in the radial joints were used throughout its entire extent. This was based on the behavior of the first magnesia lining, which failed only in the part in which separators were not used. Of course care was taken to insure a thoroughly tight job, and the compressed air tool previously described again proved invaluable in the work of shaping key brick, recessing for rivet heads and other cutting and trimming.

Fig. 1 is a photograph taken during the placing of the first magnesia lining. It has already been published, but is shown again in order to bring out the use of the pneumatic tool as an efficient aid to good bricklaying. It is equally valuable on other fire-brick jobs, such as lime kilns, boiler settings and rotary kiln hoods.

Fig. 2 shows the second lining completed. Some of the card-board separators placed between the ends of the brick to provide for longitudinal expansion may be seen. Beyond the magnesia lining, toward the discharge end, may be seen several rings of 70% alumina brick, and also a complete new nose ring with steel separators.

It will be seen that this lining, like the first one, was laid up in interlocking circles.

It is now felt that where the rivet heads are of the pan type, which do not project much, and where they are so close together that the brick can get good support from them, the best way would be to fill in between the heads with stiff mortar on which the brick are to be bedded, but in contact with the rivets. A circle laid in this way would be slightly smaller than one resting directly on the shell, and its joints would not line up with those of the larger circle so that interlocking would be troublesome and not very successful. Laying up in independent circles would do away with this entirely, and will be adopted as the procedure in placing

subsequent linings. Brick coming over one or two rivets, such as those holding wrapper or stiffening plates, should be recessed.

Starting Up the Second Lining

In putting this lining into service, a wood fire was started in the kiln at 4 o'clock one morning and powdered coal firing was begun at 10 o'clock the same morning. This is a considerably shorter warming-up period than our first magnesia lining had, and heating was done in this way purposely to see what the effect, if any, would be on the brick. No spalling was in evidence, and it appeared that the shorter preliminary heating was in no way injurious. The kiln was given half feed for two days, and in the following six days this was gradually increased to full production. We now believe that this breaking-in period could be shortened without injury to the lining. The brick took on an excellent coating immediately, and maintained it throughout the first run. It was interesting to watch the kiln as the first feed came down and to notice how quickly it adhered to the brick and began building a coating at once. The formation of a heavy and adherent coating seems to be characteristic of magnesia brick, as may be seen in some of the photographs.

Subsequent History of This Lining—First Run

The kiln with its second lining was put into operation on September 7, 1932, and ran continuously until November 15, 1932, when it was shut down for the winter because further production was not desired. Only a little of the coating fell off during this shut-down, and before operations began the next spring, the rest of it was removed manually in order to learn the condition of the brick.

It was very closely adherent, but could usually be removed cleanly. In that case the contact surface of the coating would show the brick joints; and one could infer that the steel separators had helped to hold the brick together and the coating to the brick. Fig. 3 is a photograph of a piece of coating showing the side in contact with the brick. The impress of the joints can be seen, but practically no brick has adhered to the coating.

There were other places on the same lining from which the coating, when removed, would take a layer of brick about ¼ in. thick with it. In that case the broken surface of the brick would look much like the fracture of a new one, showing that there had been no fusion, slag penetration or other change of structure.

Fig. 4 shows another piece of coating in which semi-fused spots may be seen. It serves to indicate that the lining was not favored by low-temperature operation.

When the coating had been partly removed, the photograph from which Fig. 5 was made was taken. The close adhesion of the clinker to the brick is evident even after four months of winter weather, while overhead is a piece

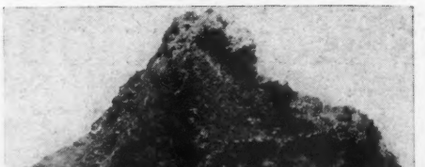

Fig. 3—Piece of coating from second magnesia lining showing clean separation from brick. Joints of brickwork are shown in reverse, but no brick adheres to coating

that was so tightly attached that it was not removed until later.

A close-up of the lining is shown in Fig. 6. The value of the steel separators in binding the brick together was even more apparent by actual inspection than it is in the photograph. Many spots may be seen where the brick were broken in removing the coating. Fig. 7 shows the appearance of the interior of the kiln after all the coating was removed. The magnesia lining lies between the two white cardboard indicators shown in the lower right-hand part of the illustration. A deep scour may be seen in the lower left-hand corner. This is in 70% alumina brick

Fig. 4—Piece of coating from second magnesia lining showing partial fusion, indicating that lining was not favored by low kiln temperatures

which was not in the hottest part of the kiln and was originally 9 in. thick. No such scouring has at any time been in evidence in the magnesia section.

The photograph shown as Fig. 8 was taken a month after the kiln had been cooled down and the hood rolled back at the end of the first run on the second lining. The thermometer stood at zero at the time. Shrinkage cracks may be seen in the coating, but it was so tightly adherent that, as stated, it was quite difficult to remove.

Second Run

The kiln remained idle from November 15, 1932, through the following winter and was fired up again on May 14, 1933, having been cold about six months. No air slaking or other evidence of the action of the air on the brick was observed. When heated up, a few flat fragments came off the brick, but they were not of such a nature as to damage the lining, and a coating was picked up and held as soon as feed came through the kiln. Operation was uneventful until October 3, 1933, when the lack of business forced a shut-down that again lasted all winter.

This last winter will be long remembered in New England for its severity. The temperature at Thomaston went down to 40 deg. below zero for several days, but what is worse, we occasionally have sudden warm, humid winds from the ocean. They last only a short time, but when they follow extreme cold, the heavy load of moisture forms a quarter-inch layer of rime or hoar frost on machinery, concrete, brick and almost everything else in our mill. A cold spell usually follows, and the frost disappears by evaporation.

The magnesia lining that had already been through two runs was, of course, exposed to this sort of treatment. The coating was left in the kiln, and no effect of temperature or weather was observed. Practically all the coating stayed in place during the winter, and was removed this spring to expose the brick and learn their condition.

It was to be expected that the lining would be somewhat thinner than at the last inspection a year previous, but the way in which it became thinner is a little out of the ordinary. There was no sign of the erosion and localized scouring that are so common with standard linings and contribute so often to their failure. It seemed that if the coating could have been removed without injuring the lining, the latter would have been left with a nearly smooth surface. But the tearing out of a coating that adhered as tightly as this one did is pretty drastic treatment, and many flat pieces came away with the coating, making the lining rather rough, and causing some misgiving as to whether it could be started up again. However, it was not as badly injured as its appearance indicated, for holes were drilled through to the shell and the average thickness, which was quite uniform, was found to be 3¾ in. In one place a corner of a brick had broken out leaving what seemed

to be a deep hole, but measurement showed that even here there was 1¾ in. of refractory left.

Every kiln lining that has been used contracts and becomes loose when the kiln is cooled down, and magnesia lining is no exception. Since the coefficient of expansion of magnesia is greater than that of fire clay, its contraction is more, and it was feared that this lining, because of its lack of depth, might collapse before it could be heated up so as to become tight in the shell, but that fear turned out to be groundless.

Third Run

The kiln was fired up again, still with the same lining, on April 5, 1934, and has been running steadily ever since. A coating was picked up at once, and has been retained. Barring some unforeseen accident, we are confident that it will finish the season. In spite of the two long shutdowns and the severe treatment of twice taking out the coating, on July 3 it passed the 310-day record of the previous magnesia lining, and on October 15, 1934, it is still carrying on.

Fig. 8—Interior of kiln at end of first run on second magnesia lining before coating was removed

About every six weeks we have to use a water poker to break down the ring that forms just beyond the burning zone. The operators are careful not to get water on the magnesia-lined section, which has never suffered from that cause. It is well known that when there is such a ring in a kiln the temperature in the burning zone is difficult to control, and generally goes higher than desired, with frequent loss of coating from clay or high-alumina brick. Our magnesia brick have never lost coating for this reason.

SUMMARY OF OPERATION

	First Lining	Second Lining
Started	Aug. 3, 1931	Sept. 7, 1932
Stopped	June 8, 1932	Nov. 15, 1932
Started		May 14, 1933
Stopped		Oct. 3, 1933
Started		Apr. 5, 1934
		Oct. 15, 1934 (still running)
Operating life—310 days		404 days as of Oct. 15,1934
Clinker produced—518,-603 bbl.		693,867 bbl. as of Oct. 15, 1934

Economic Results

The average life of 27 previous linings, one of high-grade fire-clay brick, the rest of

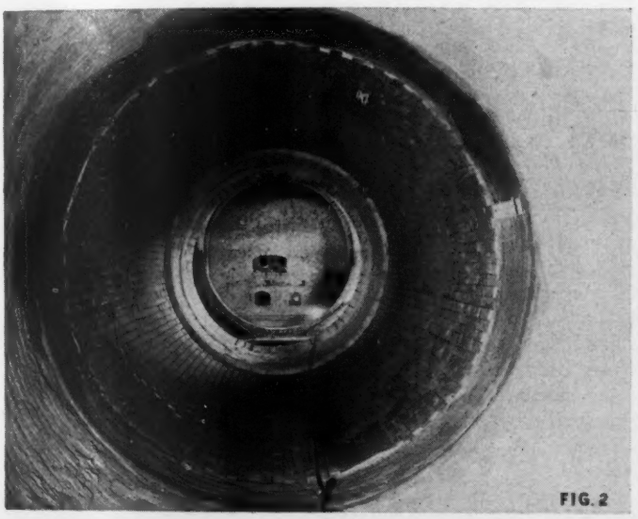

Fig. 2—Second magnesia lining complete. Looking toward dis charge end. The two coal injection pipes may be seen. Fig. 5—Second magnesia lining after 5 months' shut-down during winter shows brick well held together by steel separators where coating has fallen off. Shows very heavy coating remaining, and layer of semi-fused material between coating and brick. Note two coal injection pipes. Fig. 6—Second magnesia lining after winter shut-down and after coating was removed, showing circumferential contraction cracks due to cooling, surface of brick broken by removal of coating, and how brick are held together by oxidation of steel separators. Fig. 7—Second magnesia lining after winter shut-down and after coating had been removed, showing surface spalling but essential soundness of lining. Magnesia lining was between white markers. Scouring at near end was in 70% alumina brick originally 9 in. thick

70% alumina brick, was 54 days. These 27 linings burned 2,450,192 bbl. of clinker, or an average of 90,748 bbl. per lining. The life of the magnesia lining now in use has been 404 days to date, and it is still good. It has given seven and one-half times the life of the older linings, burning 693,867 bbl. of clinker, with an average production of 1,717 bbl. per day. This production is 7.64 times that of the older linings, and if the kiln can be kept in service this figure will be considerably exceeded.

Cement mill executives will be interested mostly in the dollars and cents aspect of this matter, and to them these figures will appeal:

LINING COST PER BARREL OF PRODUCTION INCLUDING LABOR AND MATERIAL

	Per bbl.
Average of 27 previous linings	$0.0148
Second magnesia lining	.0038
Saving in favor of magnesia	$0.0110

The cost of the second magnesia lining was somewhat more than that of the first because more brick were used. The first lining was 15 ft. long, the second 17 ft. The latter includes the whole zone of severe service in our kilns.

Since this second lining has already produced 693,867 barrels, its saving based on the figure of 1.1c per bbl. given above is $7,632.54. This is practically three times the entire cost of the magnesia lining.

The saving of $7,632.54 just shown does not take into consideration the added production obtained because of the fewer lining renewals. A large kiln can hardly be shut down, relined and put back into service with a loss of less than 4,000 bbl. of output—more likely it will be more. The lining now in use has made unnecessary at least six such shut-downs. At the minimum figure just given, 24,000 bbl. of clinker have been made that would not have been obtained in the same elapsed time except by the use of magnesia lining. This applies to one kiln only. In a mill having several kilns for whose entire output there is a market, such a possible increase in production is an important item.

During the past few years of part-time operation each cement mill has been able to sell only a part of its potential output, and its kilns have been permitted to make the corresponding amount of clinker. The cost of part-time operation depends more or less on the number of days run. If the permissible output can be obtained in a less number of days, a saving may be effected. This has not been expressed in money, because it depends entirely on local conditions.

In order that a trial of this sort may be carried out under good conditions there must be a willingness of the executive authority to make it, which implies a vision beyond the expenditure of the immediate dollar. There must also be a desire on the part of the men who actually do the work to make good with it.

We have been fortunate in that our company had confidence enough in the proposition to spend more money for a lining than one of standard type would have cost, just because the idea had a sound theoretical basis and offered hope of ultimate financial returns in proportion to the investment. That confidence has been justified. At the same time the value of plant-scale research, carried on through a long enough time to show tangible and definite results, has been shown.

Before this new kind of lining was put in, the whole proposition was talked over with our head burner, and later with his assistants. They were not told that they had to make it work. They were asked to find out just what its good and bad points might be, based on every-day practice. The result was whole-hearted cooperation, and an intense interest in the outcome.

This paper is a continuation of the story previously published of our experimenting with magnesia lining. Much has been learned that will be of value in future installations, and we feel that a real advance has been made in cement technology. It has been proved that it is possible to successfully operate a rotary cement kiln with a truly basic lining, and to do so profitably.

Sand-Lime Brick Production and Shipments in September, 1934

THE FOLLOWING DATA are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States and Canada. The accompanying statistics may be regarded as representative of the industry.

Eight sand-lime brick plants reported for the month of October, this number being one less than the number reporting for the month of September, statistics for which were published in November.

Average Prices for October

Shipping point	Plant price	Delivered
Pontiac, Mich.	$ 9.50	$12.00
Detroit, Mich.	10.00	11.50
Mishawaka, Ind.	9.15	.....
Saginaw, Mich.	10.50	.....
Syracuse, N. Y.	14.00	16.00–20.00
Toronto, Ont., Can.	12.00	13.50

Statistics for September and October

	†September	*October
Production	1,163,520	919,580
Shipments (rail)	42,000	83,000
Shipments (truck)	1,121,032	888,757
Stocks on hand	2,090,778	1,876,611
Unfilled orders	140,000	175,000

†Nine plants reporting; incomplete, four not reporting unfilled orders.
*Eight plants reporting; incomplete, two not reporting unfilled orders.

Canadian Statistics—1933

Production of sand-lime brick in Canada in 1933 was reported at 8,541 M, valued at $91,468, a decline of 21% in quantity and 30% in value from the 1932 output of 10,819 M at $131,440. Continued inactivity in the building trades resulted in the 1933 output being the smallest since the commencement of annual records. In 1920 production amounted to 39,264 M at $693,641, in 1930 the record of 82,271 M at 1,038,510 was reached, and in 1931 the output was 46,003 M at $469,783.

Only six factories manufactured sand-lime brick during 1933; four of these were in Ontario and two were in Quebec. Capital employed amounted to $789,962, the number of workers was 67 and payments for salaries and wages aggregated $62,584. Materials for manufacturing, chiefly sand and quicklime, cost $37,934.

Portland Cement Pavement Yardage

AWARDS of concrete pavement for October, 1934, are announced by the Portland Cement Association as follows:

	Sq. yd. awarded during October, 1934	Sq. yd. awarded to date, Nov. 3, 1934
Roads	3,760,064	22,767,089
Streets	1,313,289	12,306,716
Alleys	8,935	114,446
	5,082,288	35,188,251

Lime

Washington-Idaho Lime Products Co., Cerofino, Ida., J. B. Maxfield, manager, has installed a new hydrating unit. Wood-burned lime is manufactured.

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Leesburg Lime and Fuel Co., Leesburg, Va., has acquired and will operate the Leesburg lime plant to make pulverized limestone chiefly.

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Magnesite

Northwest Magnesite Co., Chewelah, Wash, resumed operations November 1. According to Walter Pick, superintendent of the "Thermax" plant, the operations have continued more or less steadily, due to orders which have been coming from all sections of the country. Shipments have been sent to California, the East and Portland. Another encouraging indication, states Mr. Pick, is the fact that both the standard as well as the acoustic board is in demand. Two ovens are being operated during one shift at the Thermax plant, while at the magnesite plant two kilns are used during three 8-hour shifts. The magnesite plant has been shut down several weeks, but stocks were running low due to shipments to supply orders, and the length of time which the plant will be operated will depend on the demand from the steel mills in the East.

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Cement Products

Kentucky Concrete Pipe Co., Russellville, Ky., is erecting a new plant. The pipe will be used for sewer construction at Russellville and also in highway construction in western Kentucky and Tennessee. The building will be 60x80 ft. and will be equipped with the latest machinery. H. D. Palmore, Frankfort, Ky., who for a number of years was connected with the state highway department, and Mr. Woody, Louisville, announce that work on the local plant will start immediately. This will make the fourth plant operated by the Kentucky Concrete Pipe Co.

United States Gypsum Co.'s New Texas Lime Plant Purchase

The Operations of the Dittlinger Lime Division, New Braunfels, Texas

AS ANNOUNCED in Rock Products, November, 1934, p. 39, the United States Gypsum Co., Chicago, Ill., has added to its numerous plants that of the former Dittlinger Lime Co., New Braunfels, Tex., which has had an interesting history. According to a report to the New York Stock Exchange, 6000 shares of common stock, held by the Gypsum company treasury, were issued in connection with this acquisition. At the current market price of approximately $40 per share, this would indicate a purchase price of about $240,000.

The town itself is of historical interest, having been founded almost a century ago by German colonists under Prince Solms von Braunfels of Braunfels, Germany, in a little known territory, then a part of Mexico. After many hardships and even starvation the settlement began to thrive and grow and a large part of its present population is made up of descendants of the original settlers.

The lime plant dates back some 26 years, having been built in 1908, and the crushed stone plant was built in 1917. Both plants have been changed and enlarged. They were described in part in an article in Rock Products, November 23, 1927, about the time they were changed over to electric power operation, and some changes were noted in the August 31, 1929, issue of Rock Products. However, a number of interesting changes and additions have been made since that time.

Quarry

The stone deposit consists of a high-calcium limestone, not as hard as some other stones, but well suited to the manufacture of lime. It occurs as a limestone ridge alongside the plant in approximatley horizontal strata and is covered with very little overburden. The present face is from 60 to 90 ft high and the quarry covers a considerable area. Quarrying is carried on in about the same manner as at other plants.

Motor-driven churn drills are used for drilling the blast holes and the broken rock is loaded to cars by three power shovels, a Model 50-B Bucyrus-Erie electric crawler type shovel with 2½-yd. dipper, a Model 60 Marion steam shovel with a 2½-yd. dipper and a smaller Osgood steam shovel. These load to 6-yd. wooden side-dump cars which are moved in 5-car trains to the crusher plant over a standard gage track circling the quarry. Steam locomotives of different types are used, burning Texas lignite. About 35 acres have been quarried out.

Until a little over five years ago the stone for the kilns was broken and loaded by hand, but this stone is now practically all sized mechanically in a revolving screen at the crushing plant.

Crushing Plant

The crushing plant started out with a more or less standardized plant with a capacity of about 1800 tons of crushed stone per 10-hour day. However, it now contains a number of belt conveyors which, in connection with the spouting arrangements, permit of making any size product and of returning any part for recrushing, so that the operation is very flexible.

The cars from the quarry are dumped to a No. 10-K Allis-Chalmers gyratory crusher from which the crushed rock is carried up in a belt bucket elevator to a single-jacketed revolving screen. Here the kiln stone is taken out over the end and three other separations made. This screen is equipped with screen plates having 2½-in. and 6-in. holes and a 1½-in. mesh jacket.

The plus 6-in. material passes to a slow moving (40 ft. per min.) inclined belt conveyor which is used as a picking table for the removal by hand of any pieces not suitable for burning into lime. Such pieces are carried back to the recrushers by a short return belt conveyor alongside, while the good material drops from the end of the inclined belt conveyor to a bin near the kilns.

The 2½-in. by 6-in. material from the first screen falls to the recrushers which consist of two No. 5-K gyratories and a No. 2 Williams pulverizer, while the minus 1½-in. material which passes through the jacket is carried up in a belt bucket elevator to two double-jacketed O'Laughlin revolving screens, where sizes from 1½-in. to ¾-in. are made.

The material from the recrushers, along with the 1½-in. by 2½-in. material from the scalping screen, is carried up in a belt bucket elevator to four parallel triple jacketed O'Laughlin revolving screens. Here four sizes are made ranging from 2½-in. down to ¼-in., and any oversize is returned to the recrushers on a belt conveyor.

The fine material passing through the outer jackets of the O'Laughlin screens is carried by means of belt conveyors and small vertical elevators to two double-deck Niagara vibrating screens over which the smaller sizes are made. One of these is equipped with ⅜-in. and ¼-in. mesh cloth and the other with ⅛-in. and 1/16-in. mesh cloth. A double-unit, double-deck Hummer vibrating screen with ⅛-in. and 20-mesh wire cloth is also used to make some of the finer sizes and a smaller Williams pulverizer located in the screen house is also used for reducing some of the material.

Thus in addition to the usual larger sizes quite a number of smaller sizes are made, such as ¼-in. to ⅛-in., ¼-in. to dust, ⅛-in. to dust and ⅛-in. to 20-mesh. In all about 15 sizes are made and stockpiled.

The bins, which are of wooden construction over concrete walls, cover three railroad loading tracks with five compartments over each track or 15 compartments in all. Railroad scales are installed on the two tracks where the most material is loaded. While being loaded the cars are moved on either track by means of a motor-driven, double-drum hoist and wire cable or by a steam locomotive, which also takes care of the switching. The tracks have a slight down grade through the plant to facilitate the handling of the cars.

The entire plant (with the exception of the vibrating screens) is driven through line shafting and belting by a 400-hp. General Electric super-synchronous motor.

Any waste material and excess screenings is carried out on an inclined belt conveyor to a waste pile opposite the crushing plant in the quarry and reloaded by shovel or crane for railroad ballast or similar uses.

The storage piles, made up of some 15 different sizes and located partly in the worked out part of the quarry and partly below the plant alongside the loading tracks, are served by two Ohio locomotive cranes, one a 20-ton and one a 25-ton.

Kilns

The burning plant consists of seven shaft kilns which are at the present time fired with natural gas, although during previous periods lignite, producer gas and oil have been used in the order named.

Each kiln has two furnaces and two burners are used in each fire box or four burners per kiln. Each burner has a simple air mixer and the gas is used at 4 to 6 oz. pressure, this being controlled by an adjustable reducing valve or pressure regulator.

Instead of the usual steam jets a single spray of water is used in each fire box to temper the flame. The fine spray is vaporized in the hot fire box and joins the flame from the gas burners. This simple use of water would seem to be just as satisfactory and more economical than the use of steam.

The spray pipe is arranged with ball and

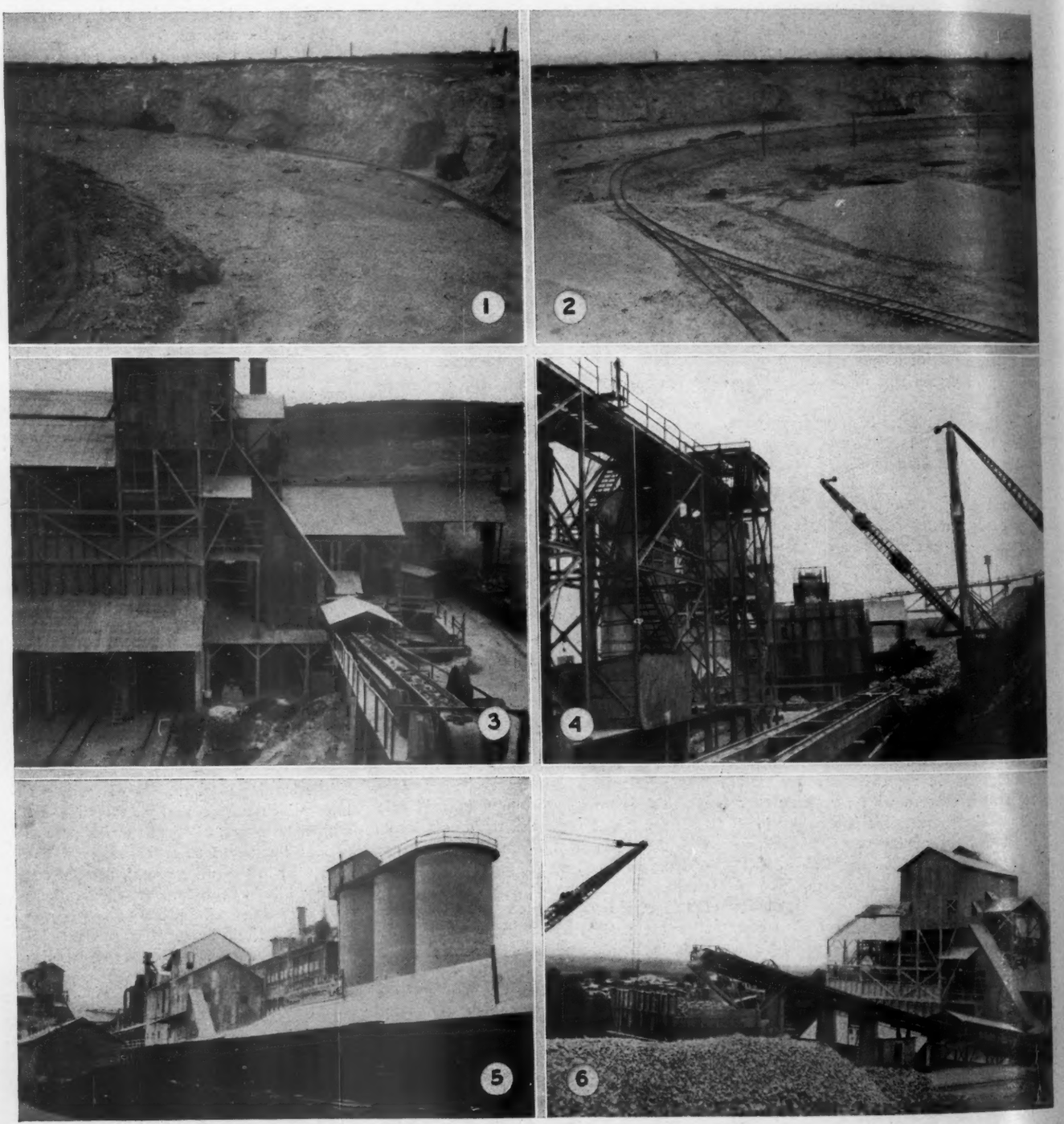
socket joints so that it may be easily directed where it will do the most good and may also be easily swung outside the furnace and the holes cleared should they become clogged.

By regulating the gas pressure and the amount of gas used, and also by the use of either natural draft or induced draft at the top of the kiln, the output may be varied from about 12 tons up to 20 tons of lime per 24 hours.

For the lower outputs the kilns are operated on natural draft but on larger outputs the top is closed and the waste gases drawn through down pipes to a motor driven Sturtevant exhaust fan. Five of the kilns are thus equipped for induced draft. The drawing of the kilns is varied from intervals of 4 hours on a low output to 2 hour intervals on a high output.

The kiln top has a rectangular opening with a small hopper above the opening to direct the stone into it. The opening is closed by means of a horizontal door or cover which is provided with four small wheels running on a track and is moved back and forth by means of a small hand-operated winch and cables.

In charging the kilns, stone is drawn from the bin previously mentioned into steel pans or skips which are then raised to the top of the kilns by a motor-driven Clyde Iron Works steel derrick rig. The skips are then emptied to a side-dump car on a 36-in. gage track above the kilns, and the car is moved to any kiln by means of a motor-driven drum hoist and cables.

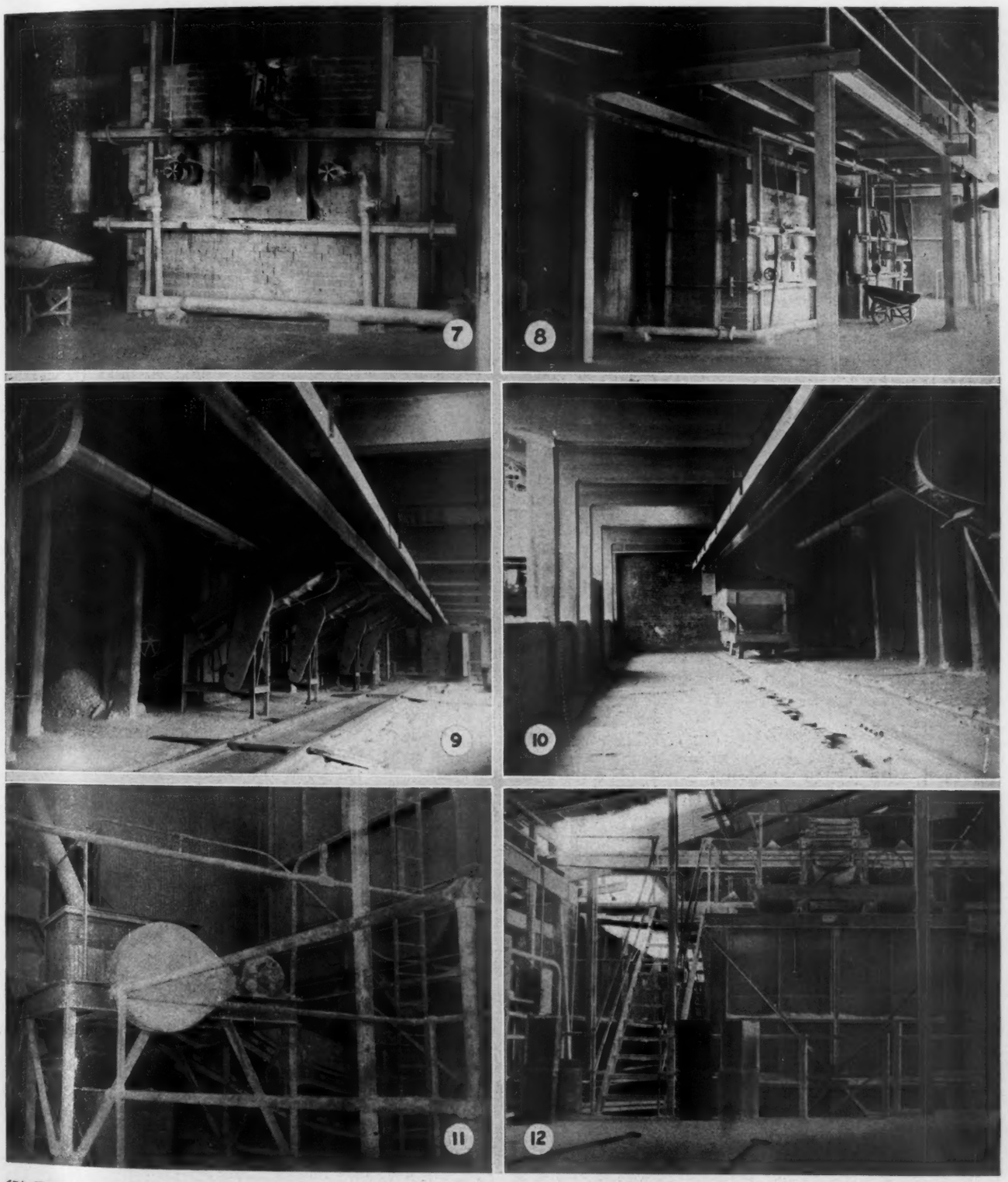


(1) Dittlinger Lime Co., New Braunfels, Tex. View of quarry; (2) another view of quarry; (3) crushing plant with quarry cars at right and picking belt for limestone; (4) derrick used in handling stone to kilns; (5) hydrating plant, kilns and crushing plant beyond at left; (6) limestone picking belt with crushing plant at right and derrick at left

For drawing and cooling the lime, complete new equipment consisting of pan conveyors, transfer car, cooling bins and picking table was added about two years ago.

Below the cooling hopper of each kiln an inclined steel apron conveyor was installed to transfer the lime from the cooler to a car movable along a track parallel to the kilns. These conveyors are each 24 in. wide by 18 ft. long and are chain driven by an individual 3-hp. motor.

The transfer car is rated at 2 tons, but will handle up to 3 tons of lime, thus taking care of a complete draw of any one kiln. The car consists of a steel hopper with drop bottom gates and is mounted on car wheels which run on a 36-in. gage track. It is driven by a 7½-hp. General Electric slip-ring motor, which is geared to the axle and is provided with a reversible drum controller located on one end of the car. Power is



(7) Front view of one of the kiln fireboxes; (8) one end of firing floor showing two kilns; (9) view along drawing floor showing drawing conveyors; (10) one end of drawing floor below kilns showing transfer car; (11) one of the pan conveyors under cooling bins discharging to picking table at left; (12) one of the lime cooling bins seen from firing floor

taken by three trolleys from a 3-phase line which is hung from the firing floor above.

Each draw of lime is moved in the transfer car to that end of the kiln plant next to the hydrating plant. Here it is weighed on a Howe track scale and is then dropped into a steel hopper, from which it is carried to the cooling bins by an elevator. This is a Link-Belt steel encased, 24-in., V-bucket combination elevator and drag conveyor which functions as a bucket elevator on the vertical run and as a drag conveyor on the horizontal run and carries across one end of the two parallel steel cooling bins.

Each cooling bin is 12 ft. wide by 60 ft. long by 22 ft. high and is divided longitudinally into five 12-ft. sections. A 24-in. drag flight conveyor extending lengthwise over each bin carries the lime from the V-bucket elevator to any point in the bin.

The bins have hoppered bottoms and the lime is reclaimed on a 36-in. steel apron conveyor below each bin, these discharging to an inclined 30-in. steel apron conveyor which serves as a picking table and also conveys the lime to the hydrating plant.

Any core or improperly burned lime is returned on a slow-moving belt conveyor to a point midway of the drawing floor of the kilns, where it is periodically returned to one of the kilns by means of a vertical steel-cased bucket elevator.

Thus the lime is drawn from the kilns, cooled, and conveyed to the hydrating plant mechanically and without any hand work except the picking out of any core.

Each conveying and elevating unit is driven by an individual motor through gearing. All of the equipment was furnished by the Link-Belt Co. except the second cooling unit, which was provided by the Chain-Belt Co.

Hydrating Plant

From the end of the pan conveyor picking table the material falls to a Link-Belt inclined shaking screen which removes the fines from the lump lime.

From this screen the lump lime is loaded to railroad cars in bulk or is put into wooden barrels directly from one of the hoppers below the screen or is put through a Sturtevant, open-door, pot-type crusher for crushing down to a size suitable for hydrating.

The loading of box cars with lump lime is done by means of a 24-in. inclined belt conveyor which is equipped with a Merrick Weightometer and carries from the end of the screen to a portable Link-Belt conveyor type loader in the car.

For hydrating, the lime from the crusher is elevated to a revolving screen or reel from which any oversize is returned to the crusher and the balance is conveyed to one of two storage bins or hoppers at the two hydrating units.

The original hydrating plant had a 4-drum Kritzer continuous hydrator with Raymond pulverizer and air separation system, which is still used. Later a Clyde batch hydrator with weighing hopper and Raymond pulverizer and air separation system was added as a separate unit. Thus hydrated lime is made in either unit and is then elevated and conveyed to a set of three storage silos of reinforced-concrete construction, each holding something over 300 tons of hydrated lime. These silos are 20 ft. inside diameter by 50 ft. high and were built by the company's own organization in 1929.

Below the silos are three Bates bagging machines which are equipped with a dust collecting system consisting of a cyclone collector and a small Buffalo Forge Co. fan with direct-connected General Electric motor.

Three grades of hydrated lime can be made, which have been known as Plastimax, Kemikal and Snowdrift, all shipped in 40-lb. paper bags.

Following extensive experiments, Plastimax was developed as a superior grade of plastic finishing hydrate with properties like the dolomitic finishing limes. This product is made by a patented process. In its production the lime is carefully selected and hydrated and is then finished in special impact type pulverizers in connection with air separation. It has not been stored in the silos but bagged and shipped as made.

Kemikal, as the name indicates, has been made particularly for chemical purposes such as water softening, etc. Snowdrift has been the standard hydrated lime. Both Kemikal and Snowdrift brands are made in either hydrating plant and stored in the silos.

In addition to these products a masonry cement containing lime, cement and other ingredients has been made and shipped in 50-lb. paper bags.

General

Purchased power is used to operate the plants, this being 3-phase 60-cycle at 220 volts for motors below 100 hp. and 2200 volts for those above 100 hp.

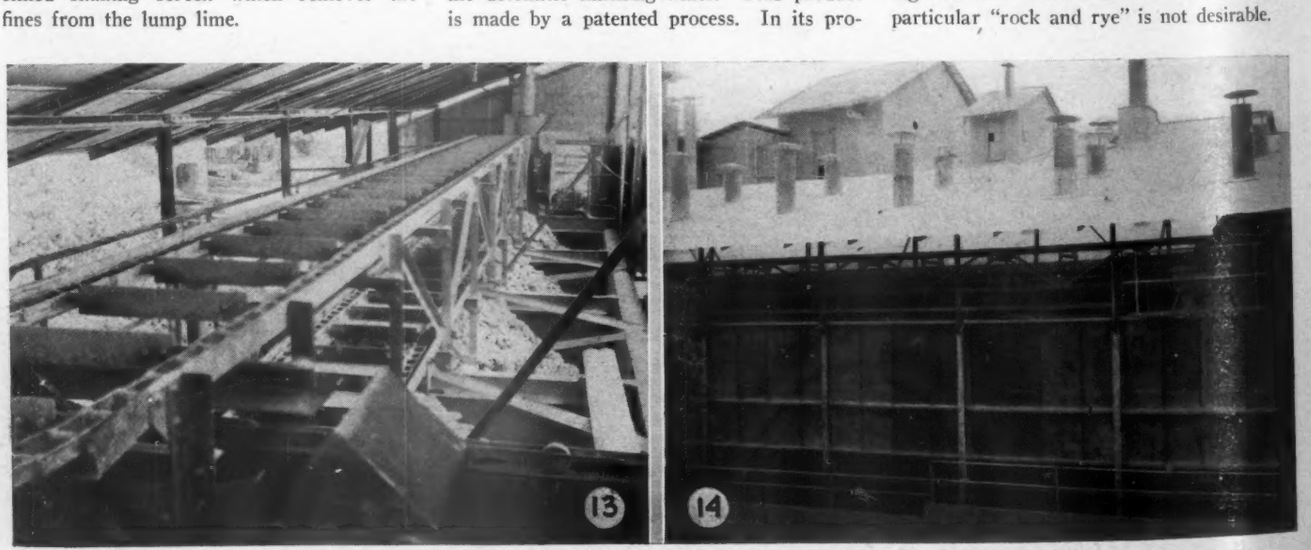
The water which is used around the plants is pumped from a well alongside the lime plant by a Pacific Pump Works deep-well centrifugal pump with a direct-connected 20-hp. vertical motor, pumping to a 100,000 gal. concrete tank on the hill above the plant. There part of the water is treated with lime and soda-ash for boiler use. The pump is arranged with an automatic control so that the motor and pump are stopped when the tank becomes full.

A complete laboratory is maintained at the plant, in which continuous tests are made to insure the uniform quality of the product, and research work is carried on in an additional laboratory.

H. Dittlinger was the founder of the business. He also founded a flour milling business, which he and his family will continue.

Crushed Stone

Central Rock Co., Lexington, Ky., has been sued by its neighbor, James E. Pepper and Co., distillers of whisky, to prevent alleged damage to the distillery from blasting and rock dust. The distiller claims this particular "rock and rye" is not desirable.



(13) Flight conveyor over one of the lime cooling bins; (14) side view of one of the lime cooling bins

Editorial Comments

Economics of Profitable Production

Under the title "Truisms and Fallacies of Production and Over-Production," John Dickinson, Assistant Secretary of Commerce, delivered an address before the Southern Economic Association at Chattanooga, November 9, that should be made *compulsory reading* for every member of a national code authority. For if they read and absorb it these leaders and guides of industry will be armed with a thorough understanding of the economic theory on which the whole program of recovery is predicated. What follows are some of the points brought out in Mr. Dickinson's address, which is all too meaty to condense satisfactorily.

It is true that economic progress, or a rise in standard of living, goes hand in hand with an increase in the production of goods and products—that the accumulation of wealth in material things makes possible the continuance of economic activity—the difference between poverty and prosperity. But, production to mean prosperity must be production of articles or products for which there is an effective demand. Production of products for which an effective demand does not exist or can not readily be created can not be increased by lowering the prices of these products; to do that decreases the purchasing power of the group or groups who depend upon this production for existence, and is part of a train of circumstances which ultimately lowers the purchasing power of larger groups.

The superiority of a so-called "economy of abundance" over the "economy of scarcity," about which many industrialists and bankers have had much to say, is not to be questioned as a generalization, but it does not hold true in specific industries at specific times, as for example, in the rock products industry at the present time. Any amount of decrease in the prices of these commodities would not appreciably increase the demand for them. Mr. Dickinson takes wheat as an illustration.

This "mal production" of a commodity is caused by rigidity in the habits both of producers and consumers of the commodity. Those who have given their lives and their worldly possessions to production of a certain commodity are not easily persuaded to relinquish production of it. Rigidity in the habits of consumers makes it difficult to create quickly an increase in demand for some product, and, of course, particularly difficult in the face of declining purchasing power. So, as Mr. Dickinson aptly states: "The real antithesis is not between general over-production and general under-production, or between an economy of plenty and an economy of scarcity, but is rather between over-production of certain articles and a healthy state of generally increasing total production."

It is not denied that the process of redressing mal production by restriction of production is costly to the community, or certain parts of it. However, where this acts to restore purchasing power to the affected groups by the community bearing the costs incidental to the reduction of output, the community derives compensating advantages which are absent from direct payments for relief, because it helps sustain the whole economic system from a collapse, and provides a basis upon which to build up again a greater effective demand.

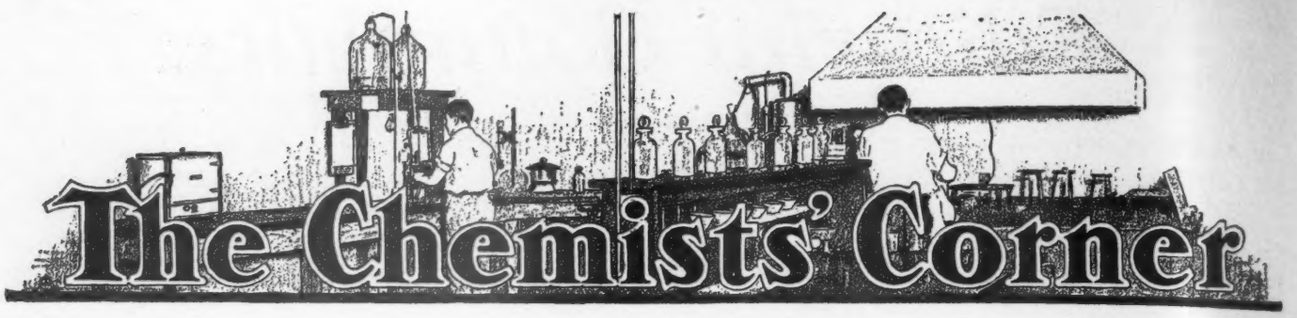
In addition, it is necessary to realize that a policy of restricting production in any given field is in the long run as wasteful as mere support of the idle unemployed, unless accompanied by the development of new channels of production into which the energies of the surplus workers can be ultimately diverted.

In the same manner Mr. Dickinson explains away the fallacies of the common charge that "we cannot spend our way out of the depression," which is undeniable unless the nature and direction of the expenditures are wise. Such expenditures have no merit, either when made by an individual business or when made by the community, unless they serve to create new wants and at the same time the means of satisfying those wants. The development of such new channels of human demand and human effort can come only from the initiative of business men and their willingness to take risks. It can be fostered and aided but can not be dictated by fiat of government.

Mr. Dickinson therefore believes that it is the first duty of government to assure a reasonable amount of stability to the economic order or system, because without this stability business men will not take risks. He thinks prolongation of the depression has been caused by fear that the economic order was crumbling. But, under conditions that the depression has left with us the business man's understanding of his problems needs to be more acute, more subtle and more complex than ever before. The business policy of one industry needs to be differentiated from that of another in the light of careful study and understanding of the special conditions of each.

Those industries which can foresee the possibility of an expanding market should normally work toward expanding production by progressively lower prices, so far as decline in costs permits; but this would be the wrong policy under conditions of over-production in a saturated market where prices have fallen to such a level that that industry can not support itself.

Mr. Dickinson's address gives quite convincing proof of the necessity in certain instances for enforced coöperation to restrict production and assure a living price, which has been so difficult for many to grasp; and much of his logic can be used by producers in this industry to defend certain parts of their codes which are now in danger of extinction. It will also fortify them in justifying to themselves expenditures for public works which will add to the permanent wealth or security of the community, although admittedly costly to this and the next generation.



Petrographic, Fusion and Slag Studies of Magnesite Refractories in Rotary Kiln Service

By R. P. Heuer,*

Director of Research, General Refractories Company, Philadelphia, Penn.

THE QUESTION of selecting the most satisfactory lining material for the hot zone of rotary kilns in cement and dolomite plants has always been an important consideration. With the condition these industries have faced during the past several years, this question has taken on greater importance than ever before. This is due to the fact that all plants are today paying closer attention to the matter of scaling down refractory costs, even in the face of the more severe service refractory linings have been subjected to due to factors such as harder burning conditions, intermittent service, the added difficulties frequently due to "green" burners made necessary by shorter shifts under the industries' codes, etc.

A number of petrographic studies have been made on unburned magnesite refractories after service in portland cement and dolomite kilns. Comparisons were made with brick of 70% alumina content which had been subjected to similar service. The 70% alumina brick were used as a basis of comparison since these bricks have been previously regarded as the most desirable refractory for rotary kiln linings. The fusion points of mixtures of various portland cement clinkers, also dolomite clinker, with unburned magnesite brick and with 70% alumina brick were also made. These studies are described in this paper. They shed interesting light on the observed behavior of magnesite refractory linings in portland cement and dolomite kilns and point out reasons for the materially improved lining life and lower refractory cost being obtained on unburned magnesite brick linings.

The comparative behavior of 70% alumina brick and unburned magnesite brick in contact with a clinker coating in cement kilns operating at high burning temperature can be considered from the viewpoint of the freezing point diagrams of the lime-alumina-silica and the lime-magnesia-silica systems shown respectively in Figs. 1 and 2. In the case of the high alumina brick, in Fig. 1, the various compositions which might be formed from cement clinker and 70% alumina brick at the point where the coating adheres to the brick would be represented roughly by the shaded area of the diagram. In this area fusible eutectics occur at 1380 deg. C. (2516 deg. F.), or perhaps even lower. The fusion point of these eutectics would be still lower in practice due to the fluxing action of impurities. In the case of the unburned magnesite brick, in Fig. 2, the various compositions which might be formed from cement clinker and magnesite brick would be represented roughly by the shaded area of the diagram. In this area the fusion points of the eutectics are not definitely known, but unquestionably they lie at much higher temperatures than those in the shaded area of Fig. 1. From this it would seem that a magnesite lining in a cement kiln would withstand the fluxing action of portland cement clinker to much higher temperatures than would a 70% alumina lining.

Fusion Point of Portland Cement and Refractories

The fusion points of mixtures of 70% alumina brick and portland cement clinker, also unburned magnesite brick and portland cement clinker, were determined. The clinker used for this work had the following chemical composition:

	%
Silica	22.46
Alumina	6.32
Iron oxide	2.54
Lime	66.96
Magnesia	1.10
Loss on ignition	0.36
Insoluble residue	0.08
Free lime	0.62

The mixtures made and the fusion points obtained are shown in Tables I and II.

These data show that the mixtures of 70% alumina brick and cement clinker develop eutectics which have fairly low melting points. The most fusible mixture investigated was a composition of 62½% high alumina brick and 37½% clinker which had a P.C.E. value of cone 11-12 (2426 deg. F.), a temperature which is frequently exceeded in rotary kiln operation. In the various mixtures of magnesite brick and cement clinker the fusion point of the eutectics remained very high and the P.C.E. value exceeded cone 38 (over 3335 deg. F.), the highest temperature available in the testing apparatus and a temperature never reached in cement kilns.

In view of the present interest in low-heat-of-hydration cement, similar fusion point determinations were made on a repre-

TABLE I—MIXTURES AND FUSION POINTS—ALUMINA BRICK

Composition No.	1	2	3	4	5	6	7
70% alumina brick—%	100	75	62.5	50	37.5	25	0
Clinker—%	0	25	37.5	50	62.5	75	100
Pyrometric cone equivalent	38	13	11-12	15	23	15	38+
Deg. F. fusion point	3335	2462	2426	2615	2876	2615	3335+
Deg. C. fusion point	1835	1350	1330	1435	1580	1435	1835+

TABLE II—MIXTURES AND FUSION POINTS—MAGNESIA BRICK

Composition No.	8	9	10	11	12	13	14
Magnesite brick—%	100	75	62.5	50	37.5	25	0
Clinker—%	0	25	37.5	50	62.5	75	100
Pyrometric cone equivalent	38+	38+	38+	38+	38+	38+	38+
Deg. F. fusion point	3335+	3335+	3335+	3335+	3335+	3335+	3335+
Deg. C. fusion point	1835+	1835+	1835+	1835+	1835+	1835+	1835+

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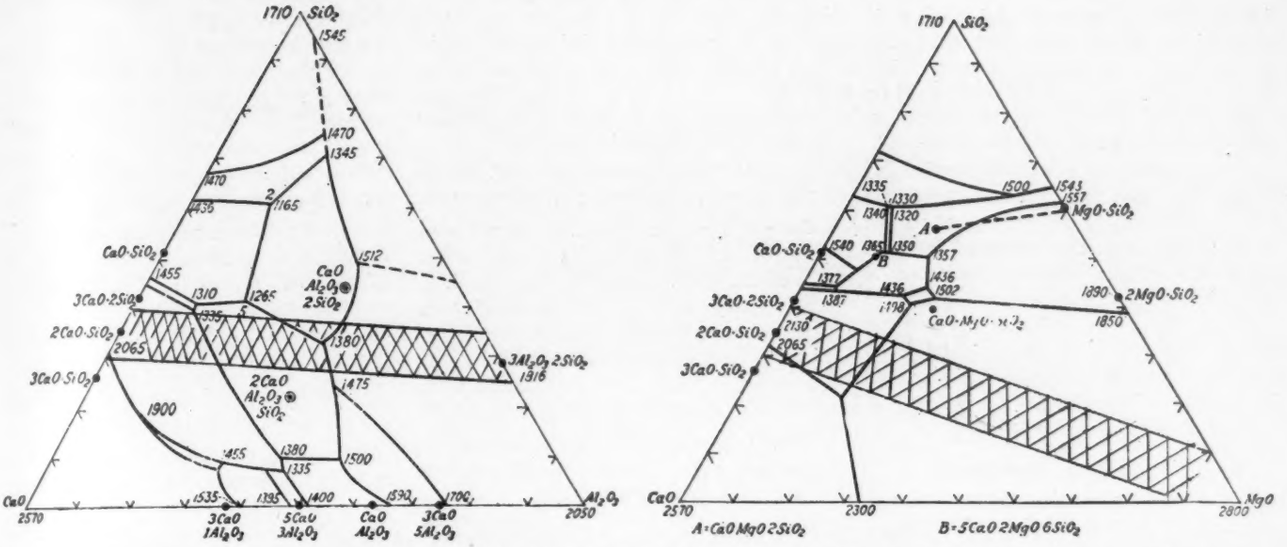


Figs. 1 and 2: Freezing point diagrams of (Fig. 1, left) lime-alumina-silica, and (Fig. 2, right) lime-magnesia-silica systems

sentative clinker of the following composition:

	%
Silica	26.06
Alumina	4.97
Iron oxide	5.89
Lime	62.08
Magnesia	0 80
Free lime	0.66
Insoluble	0.15

The results obtained are shown in Tables III and IV.

It is interesting to note that the low heat clinker develops more fusible eutectics in the mixture with 70% alumina brick than were obtained when normal clinker was used due to the fluxing action of the components other than lime, alumina and silica, which seem to be present.

Slagging Effects of Clinker on Refractories

Further confirmation of the relative slagging effect of cement clinker on high alumina brick and unburned magnesite brick at high temperatures was obtained by subjecting the two different bricks to a slagging test using finely ground clinker. For this test 9x4½x2½ in. bricks were drilled to form a pocket 2½ in. in diameter, ¾ in. deep in the 9x4½ face of each brick. The pocket in each brick was then filled with clinker, the bricks were placed in the test furnace, heated to 2800 deg. F., held at this temperature for four hours and then allowed to cool. The cooled bricks were fractured through the pockets to observe the action which had taken place. Fig. 3 is a photograph of two bricks which had been through this test. The one at the left is the unburned magnesite brick. The portland cement clinker has not attacked the brick. The clinker can be seen as a sintered mass resting loosely in the bottom of the pocket. The brick on the right represents the high alumina brick. The pocket which was originally ¾ in. deep has been cut away to more than 1¼ in. deep. The cement clinker which was originally in the pocket has fluxed with the brick and the melt which formed has been completely absorbed in the pores of the brick.

TABLE III—FUSION POINT TESTS WITH LOW-HEAT-OF-HYDRATION CEMENTS—ALUMINA BRICK

Composition No.	15	16	17	18	19	20	21
70% alumina brick—%	100	75	62.5	50	37.5	25	0
Clinker—%	0	25	37.5	50	62.5	75	100
Pyrometric cone equivalent	38	13–14	9	15	15–16	15–16	38+
Deg. F. fusion point	3335	2507	2345	2615	2642	2642	3335+
Deg. C. fusion point	1835	1375	1285	1435	1445	1445	1835+

TABLE IV—FUSION POINT TESTS WITH LOW-HEAT-OF-HYDRATION CEMENTS—MAGNESIA BRICK

Composition No.	22	23	24	25	26	27	28
Magnesite brick—%	100	75	62.5	50	37.5	25	0
Clinker—%	0	25	37.5	50	62.5	75	100
Pyrometric cone equivalent	38+	38+	38+	38+	36–37	36	38+
Deg. F. fusion point	3335+	3335+	3335+	3335+	3299	3290	3335+
Deg. C. fusion point	1835+	1835+	1835+	1835+	1815	1810	1835+

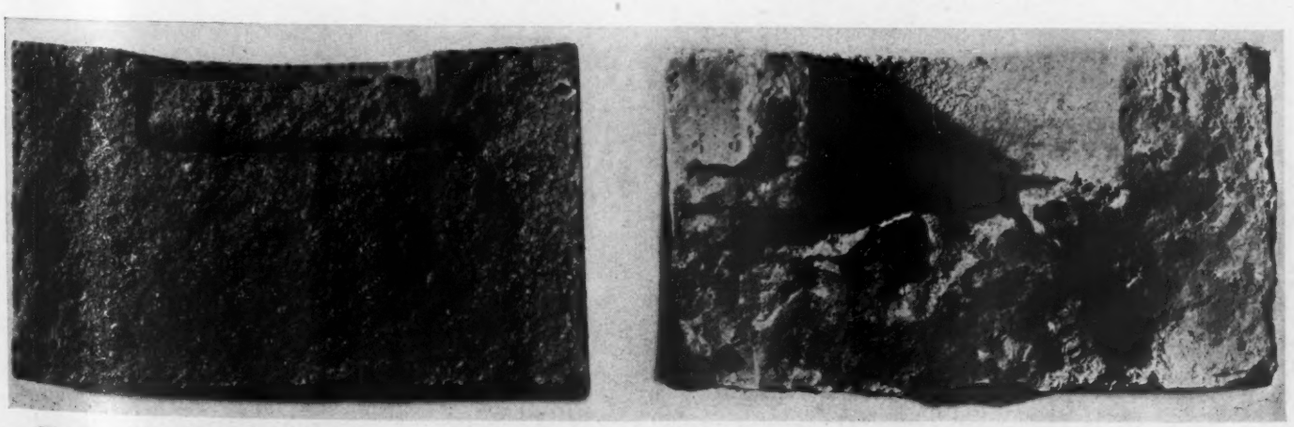


Fig. 3. Slagging test of cement clinker on refractory brick—left, unburned magnesite brick; right, high alumina brick

These slagging and fusion tests indicate that the unburned magnesite lining will withstand higher temperatures without fluxing under action of the portland cement clinker. Such a kiln lining should therefore take a coating more readily, should hold its coating at higher operating temperatures and if, during operation, the coating is lost for any reason, less brickwork should be fluxed away before another coating is formed. In the operation of portland cement kilns with unburned magnesite linings the formation of a firmly adhering coat is a comparatively simple matter. The fact that the portland cement clinker and the magnesite brick do not react to form a sticky slag on the surface of the brickwork does not prevent the brick from taking a coating.

Clinker Particles Adhere

It has been occasionally suggested that it was first necessary for the brickwork to glaze over with a sticky slag so that the clinker might be thoroughly cemented to the brickwork. The unburned magnesite linings do not develop this slagged surface. The clinker, however, does not require a slagged surface to cement the coating firmly to the brick. The charge, in passing through the burning zone of the kiln, develops the power of agglomerating which causes the clinker particles to adhere to each other, and also causes the clinker particles to adhere to the magnesite brick lining despite the fact that there is no sticky slag surface on the brickwork. Once this coating without the slagged brick surface is developed, it will adhere more firmly as the temperatures of the kiln rise. This accounts for the fact that the magnesite lined kilns hold their coatings to higher temperatures than high aluminate lined kilns.

In the case of the high aluminous brick the slagged surface of the brick, where it joins the coating, has low fusion temperature and as operating temperature reaches this point, more slag develops. Finally the clinker coating slips away from the brickwork surface. Once the clinker coating is gone the temperature of the exposed brickwork rises and the ability of the clinker to flux the brick, as is shown in the slag pocket test of Fig. 3, causes a rapid destruction of the brickwork unless the kiln temperatures are checked immediately.

Petrographic and Chemical Examinations of Alumina Brick

The relative behavior of unburned magnesite brick and 70% alumina brick in cement kilns was further investigated by petrographic and chemical examination of the brickwork and the adhering clinker after such linings had been through campaigns. Petrographic examination of a 70% alumina brick where it had been in contact with cement clinker in rotary kiln service showed that the brick had been altered for a thickness of about 1 in. from the hot exposed face. This altered section showed three zones which had the following characteristics:

Zone (*a*) was a blue vitrified zone ⅛ in. wide and about ¾ in. from the hot face of the brick. It consisted of slightly altered brick in which the outlines of the original brick grains were nearly obliterated. Corundum was visible as small, rounded, tightly matted plates which showed incipient growth.

Zone (*b*) was a yellowish colored zone about ⅛ in. wide and ⅝ in. from the hot face of the brick. Corundum was the chief phase, occurring in colorous, rounded plates much more developed than in *zone* (*a*). None of the original brick structure was apparent. Fine hairlike mullite needles were mixed with the corundum as a minor phase.

Zone (*c*) was a light green zone about ½ in. wide. This zone included the hot face of the brick. It contained long needles of crystalline material which became larger toward the hot or clinker side of the brick. The chief component of the crystalline phase was mullite. The mullite needles occurred as well developed laths in a glassy matrix. Occasionally patches of corundum occurred isolated in the mullite. Anorthite or lime-feldspar occurred in appreciable quantity as a minor phase of fine needles arranged in sheaf-like bunches with tufted ends.

Chemical analyses were made of the various zones and the results are shown in Table V.

TABLE V—CHEMICAL ANALYSES OF REFRACTORY BRICK ZONES

Chemical Analysis	(1) *Zone* (*a*) (Slightly altered brick) %	(2) *Zones* (*b*) & (*c*) (Reaction zone between clinker and brick) %	(3) (Normal clinker coating) %
SiO_2	22.20	20.52	22.20
Fe_2O_3	1.94	1.15	2.60
Al_2O_3	67.74	51.89	6.30
TiO_2	3.54	1.96	...
CaO	0.71	18.12	65.30
MgO	1.04	0.65	3.04
Alkalies...	3.89	5.47	0.61

In *zone* (*c*) the reaction between the 70% alumina brick and the clinker has been most intense. The original brick structure has entirely disappeared in the process of reaction with the clinker and a rather siliceous melt has formed from which secondary mullite has separated out as the dominant phase. The lime from the clinker also has formed anorthite or lime-feldspar as a minor phase from part of the alumina of the brick. Alkalies from the raw materials of the clinker appear to have concentrated in this zone and undoubtedly facilitated the fluxing of the brick by lowering the reaction temperature.

The corundum *zones* (*a and b*) represent regions of less intense activity. Reaction due to the calcium silicate of the clinker has not extended this far. Here the original brick structure is still slightly defined and except for an infiltration of several per cent of alkali from the hot face of the brick the chemical constitution is not greatly different from that of a new brick. The alteration of the brick structure at this point is due largely to the absorption of alkalies and the effect of higher temperatures. The glass accompanying the corundum from the mullite breakdown causes the development of the typical vitreous structure which characterizes this zone.

Fusion point determinations were made to determine the refractoriness of the material in the reaction *zone* (*c*). The P.C.E. value of this zone was found to be cone 11-12 equivalent to 2417-2435 deg. F. (1325-1335 deg. C.).

Petrographic and Chemical Examinations of Magnesite Brick

Petrographic examination was made on unburned magnesite brick which had been in contact with portland cement clinker in the hot zone of a rotary kiln. There was no thick reaction zone as was present in the case of the 70% alumina brick. Three zones were identified.

Zone (*a*) extended to within ⅛ in. of the hot face of the brick and consisted principally of unaltered brick. It was made up of the usual clusters of periclase grains of normal size. Forsterite surrounding the periclase also appeared in the usual manner.

Zone (*b*) was a reaction zone approximately ⅛ in. thick and includes the hot face of the brick. Periclase was the chief phase, being present as large particles, resulting from regrowth, tightly matted together. Only a small amount of double refracting material indicating residual forsterite or other olivine material is present between the periclase grains.

Zone (*c*). This is a region of slightly altered clinker directly in contact with the hot face of the brick. The line of demarkation between *zone* (*c*) and *zone* (*b*) is very abrupt. Periclase is not present in this zone.

Chemical analyses were made of these various zones with the results shown in Table VI.

TABLE VI—CHEMICAL ANALYSES OF REFRACTORY BRICK ZONES

Chemical Analysis	(1) *Zone* (*b*) (Reaction zone between clinker and brick) %	(2) *Zone* (*c*) (Clinker coating adjacent to zone b) %	(3) (Normal clinker coating) %
SiO_2	4.96	20.20	22.70
Fe_2O_3	4.10	3.10	1.98
Al_2O_3	4.62	6.64	5.03
CaO	9.80	59.72	65.58
MgO	71.18	6.62	3.55
Alkalies....	3.86	2.50	0.88

Examination of the ternary diagram of the magnesite-lime-silica system in Fig. 2 shows the relative stability of magnesia in contact with portland cement clinker and illustrates the refractoriness of such mixtures. The petrographic examinations have shown that little alteration has taken place in the unburned magnesite brick where they

have been exposed to the clinker at kiln temperatures. Periclase is the dominant phase in the unburned magnesite brick. It is also the dominant phase in the small reaction zone which occurs at the hot face of the brick. Little alteration of the original structure of the brick is shown in this zone.

The chemical analyses in the different zones show that *zone* (*c*), which represents the clinker in contact with the reaction *zone* (*b*), has picked up a little magnesia and alkalies, but is otherwise unaffected. In the reaction *zone* (*b*) the magnesite brick has picked up some lime and alkalies, but the total change in chemical composition is negligible. The melting point of the material in this zone is above cone 38 (3335 deg. F.; 1835 deg. C.), which is at least 900 deg. F. higher than the melting point of the reaction zone for 70% alumina brick and clinker. The above data tend to prove that unburned magnesite brick and portland cement clinker react little, if any, when subjected to the operating conditions of a cement kiln.

Hard-Burned Dolomite Kilns

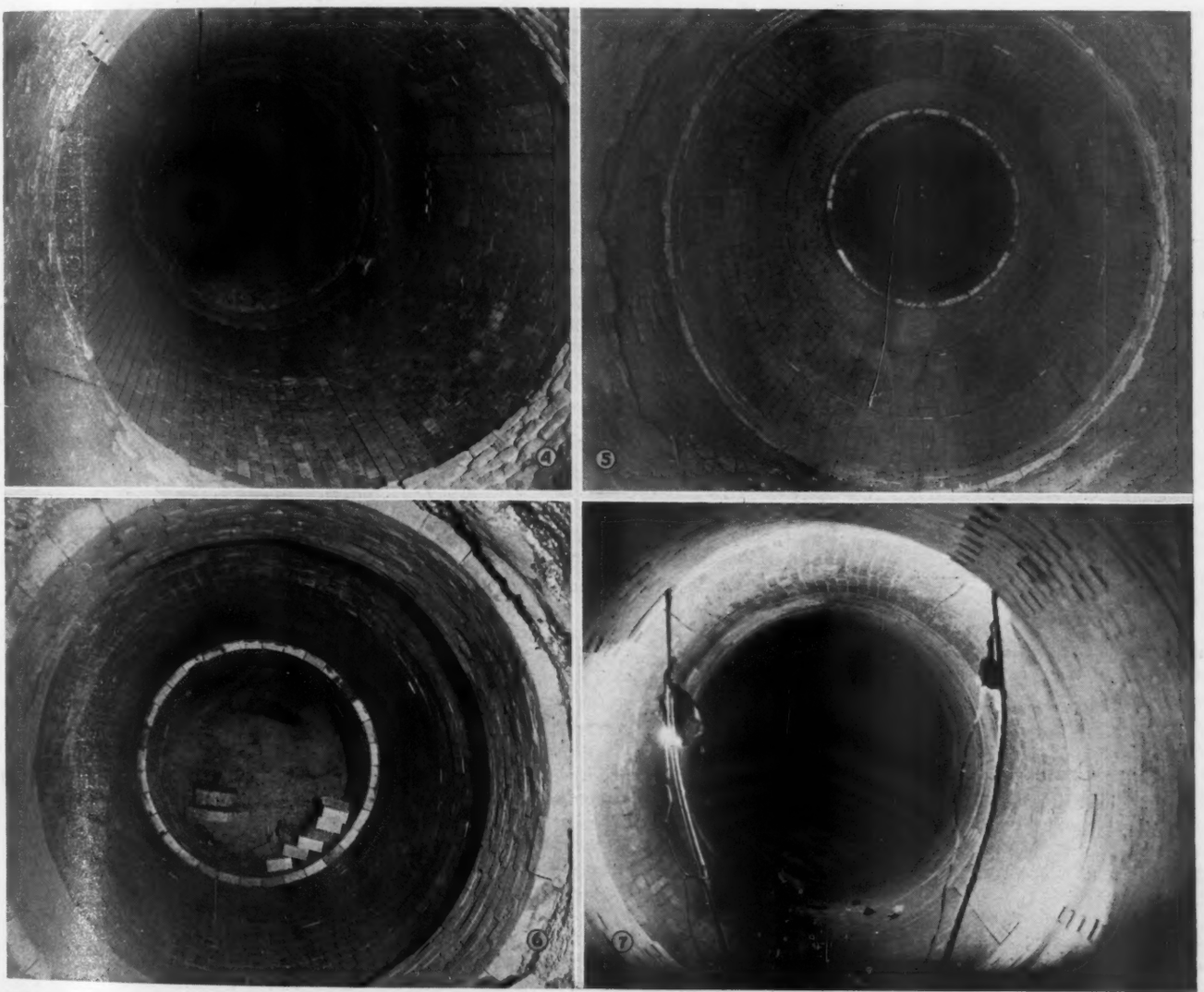
The refractory problems of lining rotary kilns for burning dolomite are even greater than those of portland cement kilns due to the higher burning temperatures of the dolomite and the high lime and magnesia content of the charge. Following the successful application of magnesite linings to portland cement kilns experiments with magnesite linings were conducted for dolomite kilns. Unburned magnesite brick were successfully applied to dolomite kilns and their relative life was, in some cases, as much as twelve times the life of 70% alumina brick.

This longer life was generally attributed to the higher refractoriness of the magnesite brick and its greater resistance to slagging when brought into contact with dolomite clinker. In order to check this, mixtures of dolomite clinker and unburned magnesite brick were made and compared in fusion point with similar mixtures of 70% alumina brick and dolomite clinker. The chemical composition of the dolomite clinker used is the following:

	%
Ignition loss	0.22
Silica	1.80
Ferric oxide	5.87
Alumina	1.10
Calcium oxide	54.60
Magnesia	36.40

The results are shown in the following tables.

The unburned magnesite brick and dolo-



Figs. 4, 5, 6 and 7. Typical unburned magnesite refractory bric k installations in rotary kilns. Fig. 4. Unburned magnesite 6-in. thick lining, 15 ft. 0 in. long, in burning zone of 11 ft. 0 in. diameter cement kiln. This lining gave 5.75 times life heretofore obtained on high alumina brick linings. Fig. 5. Unbur ned magnesite 6-in. thick lining 22 ft. 8½ in. long, in burning zone of 11 ft. 3 in. diameter cement kiln. This lining gave over twice the life heretofore obtained on 9-in. thick high alumina brick linings. Fig. 6. Unburned magnesite 6-in. thick lining, 15 ft 2½ in. long, in burning zone of 8 ft. 0 in. diameter dolomite kiln. Compared to previous life on 9-in. thick high alumina brick linings, 6 ft. 10½ in. of this unburned magnesite brick lining gave 9 times longer life and the balance 18 times longer life. Fig. 7. Unburned magnesite 6-in. thick lining, 8 ft. 4 in. long in 10 ft. diameter dolomite kiln. This lining gave 5.66 times life heretofore obtained on 9-in. thick high alumina brick linings

TABLE VII—FUSION POINT TESTS WITH DOLOMITE AND ALUMINA BRICK

Composition No.	29	30	31	32	33
70% alumina brick—%	100	75	50	25	0
Dolomite—%	0	25	50	75	100
Pyrometric cone equivalent	38	15	14	12	38+
Deg. F. fusion point	3335	2615	2552	2435	3335+
Deg. C. fusion point	1835	1435	1400	1335	1835+

TABLE VIII—FUSION POINT TESTS WITH DOLOMITE AND MAGNESITE BRICK

Composition No.	34	35	36	37	38
Magnesite brick—%	100	75	50	25	0
Dolomite—%	0	25	50	75	100
Pyrometric cone equivalent	38+	38+	38+	38+	38+
Deg. F. fusion point	3335+	3335+	3335+	3335+	3335+
Deg. C. fusion point	1835+	1835+	1835+	1835+	1835+

mite clinker mixtures show, in all cases, a fusion point exceeding 3335 deg. F.; 70% alumina brick mixtures showed, in one case, a fusion point of only 2435 deg. F. This temperature is always exceeded in high duty dolomite kilns. On this basis it is easy to explain the rapid failures which 70% alumina brick suffer in dolomite kilns. The fact that the mixtures of magnesite brick and dolomite always show a refractoriness above 3335 deg. F. explains how the magnesite brick overcame the lack of refractoriness in the 70% alumina brick.

Conclusions

These studies indicate that the use of unburned magnesite brick in rotary kilns burning portland cement, dolomite and similar basic materials under severe service is preferable to that of 70% alumina brick. This magnesite refractory is not subject to the bad fluxing attack which lime or magnesia bearing charges exert on 70% alumina brick. The unburned magnesite brick show fusion temperatures in the presence of portland cement and dolomite clinker approximately 900 deg. F. higher than the 70% alumina brick. This higher refractoriness enables the unburned magnesite linings to hold a coating better, permits higher operating temperatures, gives longer refractory life and lower refractory costs under the most severe operating conditions.

Figures 4, 5, 6 and 7 are views of typical unburned magnesite brick installations in burning zones of both cement and dolomite kilns. The captions describe briefly the service being obtained.

Crushed Stone

J. E. Baker Co., York, Penn., is reported to be contemplating the construction of a new crushing plant at Blue Mountain, Md. Widdecombe Engineering Co., York, is the engineer.

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Walter C. Boehm, crushed stone broker, Woodsville, Ohio, has brought suit for $200,000 against six dolomite producers of northern Ohio for alleged breach of contract and damages for loss of sales. Mr. Boehm claims he entered into a contract with one of these producers under which he was to receive 5c per ton commission on all raw dolomite (stone) sold by him to the steel companies. The agreement, he claims, provided that the sales were to net the stone company 35c a ton. From the quarries from this district about 400,000 tons a year have been used by the steel concerns. In May of last year, the petition says, the defendants, including six concerns, agreed to allot and restrict production among themselves. Prices of the raw dolomite were almost doubled, the petition sets forth. Steel companies then turned to substitutes, it says. Then he was informed, the petitioner says, that no sales would be made through him, although his contract had not expired. His actual loss, Mr. Boehm said, was $100,000 in commissions on material he was unable to deliver under contracts with the steel companies. The law, he explains, provides that he is entitled to double the amount of his losses.

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Sterling Crushed Stone Co., Sterling, Mass., has petitioned the federal court at Boston, Mass., for a reorganization under the new bankruptcy act. Liabilities of $147,807 were admitted and assets of $201,258 claimed. The corporation, which has a plant for the quarrying of crushed trap rock at Sterling, has an office in Boston. The greater part of its business is with municipalities or contractors engaged in the construction of public works. According to the debtor's petition it is unable to meet its debts as they mature and desires to effect a plan of reorganization. The company recently filed suit against one of the leading explosives manufacturers, claiming it had failed to furnish dynamite in accordance with its contract.

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Federal Soil Erosion Projects are calling for much pulverized limestone. In Wisconsin and Minnesota numerous small local quarries are being opened and operated by relief labor. In Ohio and North Carolina large purchases are being made from commercial producers.

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Limestone Products, Inc., Dallas, Ore., new limestone mill, was dedicated recently with a program at the main storage warehouse. The mill cost $15,000. It has been in operation for some months, but the dedication was delayed until the rush season was over. Present were 11 county agents and other agricultural experts. Harry M. Hawkins, president, was present from Portland and spoke. He thanked Portland and Salem business men whose coöperation made the new industry possible. Capacity of the plant is 80 tons of finely ground limestone for each 8-hour shift. The mill is electrically operated. Truck and rail transportation are available. The product will be known as "Dallas Ground Limestone."

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Lynn Sand and Stone Co., Lynn, Mass., trucks from Swampscott were listed among the winners for highway safety in the statewide contest by the governor's committee on street and highway safety for September. The awards are made each month on the basis of the lowest accident rate per 100,000 hours of operation, and there are groups and classes of vehicles in the contest.

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Henry Brothers, farmers and small quarry operators, Clayton Village, Penn., were recently fined for beating a 17-year-old girl and for violating the child labor laws. The girl, according to her story, had been compelled to work in a quarry and crushing plant since early childhood.

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Kentucky - Virginia Stone Co., near Wheeler, Va., has been awarded a contract by the Kentucky State Highway Commission for the construction of walls, stops, tree guards, and surfacing for parking areas at the Dry Ridge bridge on the Cumberland Falls-Corbin road. W. B. Paynter is manager.

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Kelley Island Lime and Transport Co., Cleveland, Ohio, closed its Kelley's Island, Ohio, plant on November 10. During the past season 50 boat loads of flux stone, totaling 268,610 tons, were shipped from the island. This was slightly less than 1933, when 53 loads, or 285,633 tons, were quarried.

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Schultz and Blosser, Roselin, Ohio, are reported to be contemplating opening a quarry and building a crushing plant near Decatur, Ind.

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Catalina Island, Calif., quarries getting out rip-rap for coast harbor work, had a blasting accident November 13, which resulted in the deaths of seven men. Premature explosion of black powder while transferring it from 25-lb. container cans to canvas sacks was the cause.

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Slate

Whitney Slate Quarry, Rosasco Junction, Calif., has recently shipped 20 carloads of slate to San Francisco, where it is used in the manufacture of roofing and in making paper for refrigerator cars. J. L. Whitney, Jamestown, is in charge of operations and at present is employing five men. John Sullivan is foreman. The quarry, only 200 ft. from the main Sierra Railway track, is equipped with a power hoist and compressor. Its output is a carload of slate every three days.

Rock Products News Briefs

Slag

France Slag Co., Toledo, Ohio, has purchased the **Cashion Slag Co.,** Donora, Penn. H. A. Van Mick is general manager, H. C. Bostlemann, superintendent.

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Sand and Gravel

Saxet Sand and Gravel Co., Victoria, Tex.: J. K. Mortlock, who handles sales and advertising has described for *Printers' Ink* an unusual sales method: "It may interest you to know," he says, "that after reading an article published in *Printers' Ink* dealing with more forceful salesmanship and use of samples, I loaded up a 6,000-lb. truck load of road gravel as a sample. I hauled it forty-five miles to show a customer who would not come to the plant to see the material. This customer had previously given preference to my competitor, but after seeing the quality of the material in the sample placed an 11,000-ton order with us."

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Chas. A. Eddleblute, Stockport, Ohio, has filed an application with the U. S. War Department for a permit to dredge sand and gravel from the Muskingum river between Marietta and Dresden, a distance of 91 miles.

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Union Sand and Gravel Co., Huntington, W. Va., has applied to the U. S. War Department for a permit to dredge sand and gravel for commercial purposes from the Ohio river between Catlettsburg, Ky., and Portsmouth, Ohio.

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Byron Sand and Gravel Co., Oregon, Ill., has won a damage suit against the Illinois Northern Utilities Co. in the Ogle county circuit court. The jury returned a verdict against the power company for $10,375 and damages for refusing to furnish power to the plaintiff. The sand company claimed the utility company cut off the electric power in 1932 and caused the closing down of the plant.

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Montgomery Gravel Co., Montgomery, Ala.: On November 4 a white man and two negroes, employes, lost their lives in the gravel pit when they came in contact with current from a shorted high voltage submarine cable and were thrown into a lake. The men were attempting to add a joint to a suction dredge line at the time of the accident.

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Consumers Sand Co., Topeka, Kan., in bankruptcy, was offered $4,500 for its Sterling, Kan., plant and property. The city commissioners propose to turn the pit into a swimming pool and pleasure resort.

Missouri Pacific R. R., St. Louis, Mo., is reported to have purchased 360 acres near Fowler, Colo., for development of a sand and gravel pit.

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Recent Contract Prices—Bids Received

Omaha, Neb.: County highway officials are placing orders for approximately 7000 tons of sand and gravel at 70c per ton, f.o.b. plant.

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Carthage, Ill.: Many Hancock county farmers are taking advantage of present opportunities to lime their fields at the lowest cost for many years. With several local quarries producing agricultural limestone as a by-product from their crushers, the large producing companies are reducing their prices to meet this competition. Many farmers are making use of the products from the local quarries even though it is not always as high quality as that from some of the larger companies. The prices from one large company have recently been reduced 20c per ton below the prices of last summer which were already considerably below normal. These prices are as low as $1.20 to points delivered on the C. B. & Q. R. R.

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Beaver Dam, Wis.: City board of public works approved purchase of 300 cu. yd. of gravel from Roedl & Graff at $1.30 per cu. yd. of 3000 lb.

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Lincoln, Neb.: Contracts for about 200 carloads of maintenance gravel which will be used on state highway projects in southeastern Nebraska have been awarded as follows:

Between Table Rock and Verdon, 1,434 cu. yd, $2.04; to Allen Davison Co., Beatrice.

Between Pawnee City and Burchard, 1,284 cu. yd. at $1.83; to same firm.

Between Pawnee City and Table Rock, 1,434 cu. yd., $1.86; to Blue Valley Sand & Gravel Co., Fairbury.

Between Auburn and Shubert, 515 cu. yd., $1.74; to Roberts Construction Co., Lincoln.

Between Tecumseh and Brownville, $3,640 cu. yd., $1.88; to Koehler Construction Co., Lincoln.

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Morrison, Ill.: Bids for county road graveling jobs: Delivering 650 cu. yd. in Erie township, R. B. Kniskern, $1.25 per cu. yd.; William Franks, 90c; Eddie Loftus, 95c; H. Tabor and son, $1.34. Delivering 2,000 cu. yd. in Hahnaman and Tampico townships, Maxfield and Carlton, $1.10; W. D. Hunter, 82 5c. Delivering 600 cu. yd. in Newton township, William Franks, $1; Eddie Loftus, 95c. Delivering 1,000 cu. yd. in Clyde township, R. B. Kniskern, 92c; Vernon Schroeder, $1.78; Maxfield and Carlton, 97c; Eddie Loftus, 95c.

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Cement

Edison Portland Cement Co., New Village, N. J., lost pattern storage and carpenter shop by fire on October 23. Plant officials estimated the loss at $60,000, most of which was due to the destruction of valuable patterns stored in the two-story building. The loss is covered by insurance.

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Hudson, N. Y.: A safety exposition, the first of its kind ever held in Hudson, opened recently in the city hall auditorium. The exposition was conceived by Michael J. Degnan, safety director of the Universal Atlas Cement Co. and Gunnar Hummel, safety director of the Lone Star Cement Co. They received full coöperation of the State Department of Labor, which sent the state's entire exhibit of the state fair and three safety experts. Approximately 5500 people attended the exhibit.

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Santa Cruz Portland Cement Co., Davenport, Penn.: Expansion into the freighting and distributing business by the company has increased to nearly 400 the number of men employed. That number of men will be employed for several months until construction work on silos has been completed, when it will be cut to approximately 325 in permanent employment. Joseph Riordan, superintendent of the plant, said 42 men will be permanently employed on the *Santacruzcement,* freighting vessel which began its hauling operations recently. With 250 men employed at the plant on the coast, the company plans to permanently employ five men at each of its storage silos at Portland, Oakland harbor, Stockton, Long Beach and Honolulu. Twenty men are being employed at Oakland finishing the silos there, and 75 more are employed now at Long Beach on construction of storage facilities. As soon as they are completed work will start at Honolulu.

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Florida Portland Cement Co., Tampa, Fla.: The two-year fight to restrict the importation of Danish cement into Puerto Rico, has ended in failure. According to U. S. Treasury Department rulings, no evidence of dumping on the part of Danish manufacturers was discovered by customs agents. The ruling has the effect of voiding certain regulations effective while the matter was under investigation.

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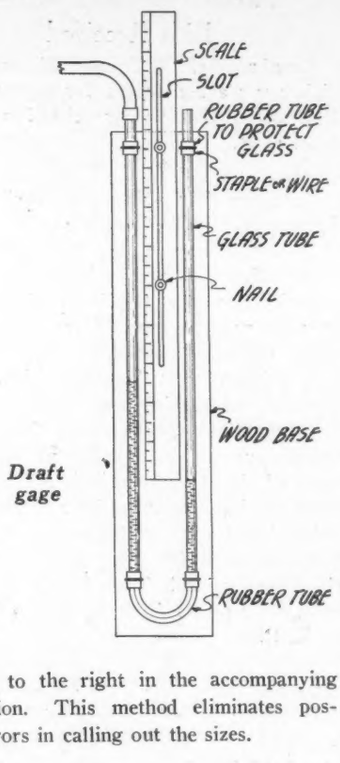
Lehigh Portland Cement Co., Birmingham, Ala., plant lost a suit for $710 brought by a woman neighbor who claimed her home was damaged by vibration from blasting operations.

Hints and Helps for Superintendents

Direct Reading Draft Gage

E. H. Fleischman,
Keystone Portland Cement Co., Bath, Penn.

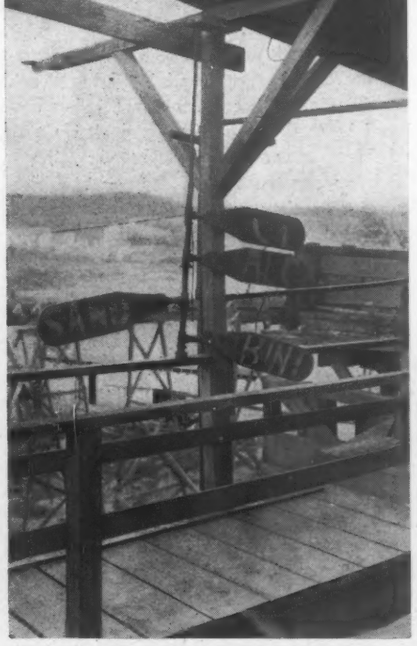
WE recently constructed several draft gages of direct reading type, as shown in the illustration. The scale is slotted and slides on the two large headed nails. The bottom of the scale is brought to the lower liquid level and the draft read directly from the upper level. The U-tube may be bent of glass as usually constructed, or made of straight glass tubes connected by a rubber tube, and held with staples or wire around the rubber protected glass tube.



Draft gage

Signals for Sizes at a Sand Plant Stop Errors

SWINGING PADDLES pivoted on a central rod of iron can be used for signaling from plant to stock pile or from office to plant. The paddles in the illustration are painted with the name of a particular size of sand or gravel and serve to tell the loader what size is required. When not in use, the boards are hooked back out of sight from below, as shown by the three paddles to the right in the accompanying illustration. This method eliminates possible errors in calling out the sizes.



Semaphore sand size signals

Skip Cars With New Front-End Design

IN THE LIMEROCK producing sections of Georgia and Florida, skip cars of the design shown in the illustration are used at practically all the operations. The skip cars are pulled up an incline and the power from the hoist itself dumps the skips forward to the crushers.

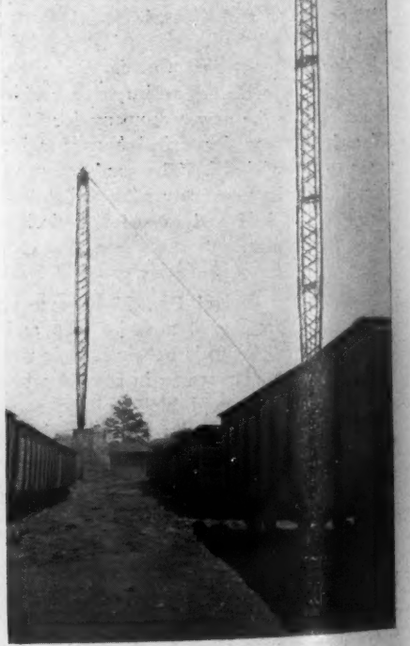
We have shown illustrations of these skips previously, but the one here shown is slightly different, having a damper-like front and to which the load line is attached. The front to the skip permits of about one-third greater load capacity and at the same time is not in the way when the skip dumps. During the dump, from the design of the skip, the front rises out of the way, and as the skip returns to the loading position the front assumes the position shown in the illustration (center column) below.

Skip with new front-end design

Cheap and Flexible Stock Piling Method

CRUSHED ROCK ASPHALT from the quarry and plant of the Kentucky Rock Asphalt Co. is towed on river barges about 70 miles to Bowling Green, Ky., and stored in stock piles for rail or water shipment.

The methods of stocking and handling the large amount of material could be put in use by producers of other aggregates. The efficient operation of the overhead cableway system, for instance, should be of particular interest. The material is unloaded from the barges directly to a hopper, which feeds to the cars on this cableway. The unloading is done by a steel derrick manufactured by the American Hoist and Derrick Co., equipped with a 3-yd. Owen bucket. Since the cableway system is double, the hopper which re-



Supporting masts for cableway

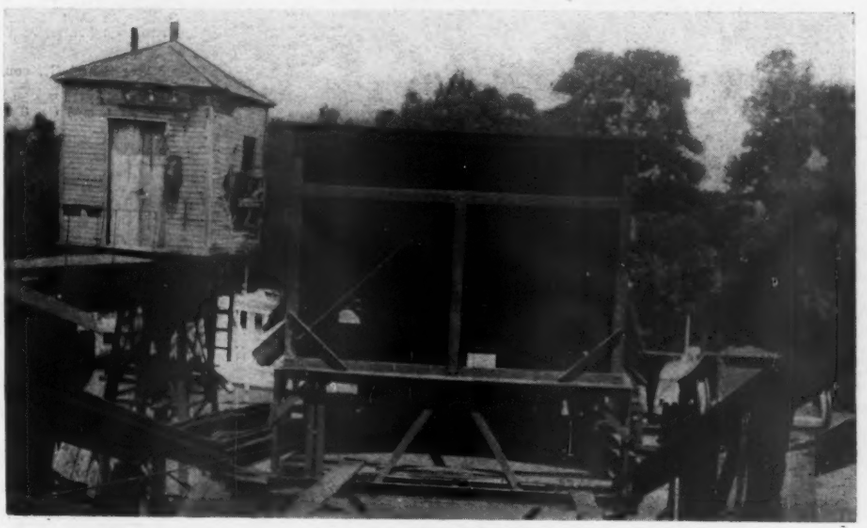
ceives the material is divided so that it will feed to both cableway cars at the same time. Under each side of the hopper is a short track which receives the cableway car as it slides back to the hopper, and starts it off again toward the stock pile. Each cableway has two cables, the car riding on them as on tracks.

Extra Cable

For moving each car there is an additional cable running from the car to the high steel supporting mast at the other end of the line, back overhead to the hoist and on to a wheel at the hopper, around which it is looped before being attached to the rear end of the car. These cables thus form complete circuits and are operated directly from the hoist house which stands next to the receiving hopper. A Bedford friction hoist is used and it is equipped with a separate drum for each cableway, since the two sides of the system can be operated independently of each other. The hoist is driven by a Chandler & Taylor steam engine having a 15x16-in. cylinder. Everything at the plant is steam driven because it is possible to obtain cheap coal. The cars, which have a capacity of 4 cu. yd., return to the loading hopper entirely by gravity. The entire cableway system was built by the American Steel & Wire Co.

The cableway cars can dump direct to railroad cars or they can stock-pile the material. There is a storage space of five acres which is entirely covered by parallel railroad tracks laid on 25-ft. centers. The rock is stored right over these tracks and as a portion of the pile is reclaimed there is always one track to which the reclaiming shovel can load directly.

Above: Reclaiming shovel at Kentucky Rock Asphalt Co. plant



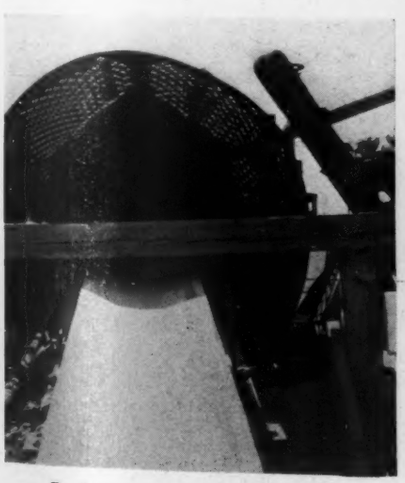
Above: Divided hopper to feed two cableway cars. Below: Double cableway and tracks

Feeding a Conical Spiderless Screen by Conveyor

By Dare Paris,
Monrovia, Calif.

THE USUAL METHOD of feeding a conical spiderless screen is with the use of a long steel chute extending to the back end of the screen. At one plant this type of screen was installed for the washing of the stone, and as room was limited, it was impossible to use a chute without raising and lengthening the main conveyor belt at considerable cost. So a stub conveyor was installed which is shown in the accompanying illustration, to carry the material from the main conveyor back into the screen. To keep the belt dry a steel boot was built inside the screen and bolted to the conveyor frame. The drive is on the tail pulley.

This arrangement has been in service for several years and has required very little attention or upkeep.



Stub conveyor to feed screen

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Allentown P. C., com.[47]	11-21-34	5	7	
Allentown P. C., pfd.[47]	11-21-34	5	7	
Alpha P. C., com.	11-21-34	10½ actual sale		
Alpha P. C., pfd.[47]		called for Feb. 1, '35	1.75 (qu.)	Dec. 15
Amalgamated Pbos. 6's, 1936[47]	11-12-34	100	102	
American Aggregates, com.[48]	11-15-34	1½	3	
American Aggregates, pfd.[48]	11-15-34	3	5	
American Aggregates, 6's 1st mtg. 3/6's, 1943 new bonds[48]	11-15-34	45	....	
American Aggregates, 6's 1943, old bonds[48]	11-15-34	45 F	....	
American L. & S., 1st 7's[48]	11-15-34	92	94	
Arundel Corp., com.[48]	11-15-34	10	15	
Ashgrove L. & P. C., com.[49]	11-15-34	94½	....	
Ashgrove L. & P. C., pfd.[49]	11-15-34	10½	....	
Atlas P. C., com.[49]	11-15-34	10	14	
Atlas P. C., 8% cum. pfd.[49]	11-15-34	10	40	
Bessemer L. and C., Class A[47]	11-22-34	3	4	
Bessemer L. and C., 1st 6½'s, 1947[46]	11-15-34	27 F	30 F	
Bessemer L. and C., cert. of dep., 1947[46]	11-16-34	30	36	
Bloomington Limestone, 6's[47]	11-21-34	8	12	
Boston S. and G., new com.[37]	11-15-34	1	2	
Boston S. and G., new 7% pfd.[37]	11-15-34	5	10	
Boston S. and G., 7's, 1939[37]	11-15-34	60	....	
Calaveras Cement, com.[40]	11-15-34	1	2	
Calaveras Cement, 7% pfd.[40]	11-15-34	30	33	
California Art Tile, A[9]	11-20-34	1	2	
California Art Tile, B[9]	11-20-34	....	½	
Canada Cement, com.[42]	11-14-34	7¾	8¼	
Canada Cement, pfd.[42]	11-14-34	50½	51½	
Canada Cement, 5½'s, 1947[42]	11-14-34	99	100	
Canada Crushed Stone, bonds[42]	11-14-34	80	....	
Canada Crushed Stone, com.[42]	11-14-34	10	nominal	
Certainteed Products, com.	11-17-34	6	6¼	
Certainteed Products, pfd.	11- 9-34	24½	28½	
Certainteed Products, 5½'s, 1948	11-17-34	68⅞	69¾	
Consol. Cement, 1st 6½'s, 1941[47]	11-21-34	25	27	
Consol. Cement, pfd.[47]	11-21-34	2	3	
Consol. Oka S. and G. (Can.), 6½s[42]	11-14-34	25	30	nominal
Consol. Oka S. and G. pfd.[42]	11-14-34	....	24	
Consol. S. & G. pfd.[12]	11-15-34	....	24	
Consol. Rock Prod., com.[47]	11-21-34	1	2	
Consol. Rock Prod., pfd.[47]	11-21-34	2	3	
Consol. Rock Prod., units[47]	11-21-34	3	5	
Construction Mat., com.[47]	11-21-34	1	2	
Construction Mat., pfd.[47]	11-21-34	2	4	
Consumers Rock & Gravel, 1st mtg. 6½'s, 1948[47]	11-21-34	29	32	
Coosa P. C., 1st 6's[47]	11-21-34	15	20	
Coplay Cement Mfg., pfd.[47]	11-21-34	7	9	
Coplay Cement Mfg., 6's, 1941[47]	11-21-34	60	65	
Dewey P. C., com.[47]	11-21-34	85	95	
Doiese and Shepard[49]	11-15-34	8	10½	
Dufferin Pav. and Cr. Stone, com.[42]	11-14-34	2	3	
Dufferin Pav. and Cr. Stone, pfd.[42]	11-14-34	....	23	
Federal P. C., 6½'s, 1941[47]	11-21-34	32	35	
Fla. Port. Cement, 6½'s, '37[46]	11-16-34	80	82½	
Florida Port. Cement units[47]	11-21-34	8	10	
Florida P. C., 7% cum. pfd.[49]	11-15-34	7¼	9½	
Giant P. C., com.[47]	11-21-34	2	4	
Giant P. C., pfd.[47]	11-21-34	10	12	
Gyp. Lime & Alabastine, Ltd.	11-20-34	5¼	5½	
Gyp. Lime & Alabastine 5½'s, 1948[47]	11-23-34	74	77	
Hawkeye P. C., cap.[49]	11-15-34	20	....	
Hercules Cement, com.[49]	11-15-34	17	....	
Hercules Cement, 7% pfd.[49]	11-15-34	72	....	
Hermitage Cement, com.[47]	11-21-34	6	10	
Hermitage Cement, pfd.[47]	11-21-34	40	50	
Ideal Cement 5's, 1943[47]	11-21-34	100	102	
Ideal Cement, com.[47]	11-23-34	36	38	
Indiana Limestone 6's[47]	11-21-34	8	10	
International Cem. bonds, 5's, 1948	11-17-34	96¼	97	
International Cement, com.	11-17-34	25¾	26	
Kelley Island L. and T.	11-21-34	9	10	
Ky. Cons. Stone, 6½'s, 1938[47]	11-23-34	10	12	
Ky. Cons. Stone, com.[47]	11-21-34	1	2	
Ky. Cons. Stone, pfd.[47]	11-21-34	2	3	
Ky. Cons. Stone, 1st Mtg. 6½'s[46]	11-16-34	10	18	
Ky. Rock Asphalt, com.[46]	11-16-34	¼	¾	
Ky. Rock Asphalt 6½'s, 1935[47]	11-16-34	2	3	
Ky. Rock Asphalt, pfd.[46]	11-23-34	50	55	
Lawrence P. C.[47]	11-23-34	11	13	
Lawrence P. C., 5½'s, 1942[47]	11-21-34	70	72	
Lehigh P. C., com.	11- 9-34	14⅝	actual sale	
Lehigh P. C., 7% pfd.	11- 9-34	....	77	.87½ Jan. 2, '35
Louisville Cement[47]	11-21-34	70	80	
Lyman-Richey 1st 6's, 1935[47]	11-21-34	98	100	
Marbelite Corp., com. (cement pts.)[40]	11-15-34	30c	60c	
Marbelite Corp., pfd.[40]	11-15-34	2	3½	
Marblehead Lime 6's, 1939	11-23-34	28	40	
Marquette Cement, com.[47]	11-21-34	16	18	
Marquette Cement, pfd.[47]	11-21-34	78	82	
Marquette Cem. Mfg. 1st 5's, 1936	11-21-34	93	96	
Marquette Cem. Mfg. 1st 6's, 1935[46]	11-16-34	94½	100½	

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Material Service Corp.[47]	11-21-34	3	5	
McCrady-Rodgers, com.[47]	11-21-34	5	7	
McCrady-Rodgers, 7% pfd.[47]	11-21-24	15	20	
Medusa P. C., com.[47]	11-21-34	8	10	
Medusa P. C., pfd.[47]	11-21-34	25	35	
Michigan L. and C., com.[47]	11-21-24	60	65	
Missouri P. C.[49]	11-15-34	6	7½	
Monarch Cement, com.[47]	11-21-34	80	90	
Monolith P. C., com.[9]	11-20-34	1¾	2¼	
Monolith P. C., 8% pfd.[9]	11-20-34	4¾	5½	.25 Dec. 10
Monolith P. C., units[47]	11-21-34	8	12	
Monolith P. C., 1st Mtg. 6's[9]	11-20-34	90	95	
Monolith Portland, Midwest[9]	11-20-34	40c	60c	
National Cem. (Can.) 1st 7's[42]	11-14-34	75	85	nominal
National Gypsum A., com.	11- 9-34	9¾	actual sale	
National Gypsum, pfd.	11-16-34	84	86	
National Gypsum 6's[47]	11-21-34	97	100	
National L. and S. 6½'s, 1941[47]	11-21-34	88	92	
Nazareth Cement, com.[47]	11-21-34	5	7	
Nazareth Cement, pfd.[47]	11-21-34	30	40	
Newaygo P. C., 7% cum. pfd.[49]	11-15-34	18	....	
Newaygo P. C., 1st 6½'s '36[46]	11-16-34	60	65	
New England Lime 6's, 1935[14]	11-16-34	5	10	
N. Y. Trap Rock 1st 6's, 1946.	11- 9-34	52	actual sale	
N. Y. Trap Rock, 7% pfd.[48]	11-15-34	55	....	
North Amer. Cement, 1st 6½'s[47]	11-21-34	35	40	
North Amer. Cement, com.[47]	11-21-34	½	1	
North Amer. Cement, 7% pfd.[47]	11-21-34	1	2	
North Shore Mat. 1st 6's[47]	11-21-24	25	35	
Northwestern Port. Cem. units[9]	11-20-34	36	40	
Northwestern States P. C.[49]	11-15-34	16	19	
Ohio River S and G., com.[49]	11-15-34	....	5½	
Ohio River S. and G., 1st pfd.	11-21-34	35	....	
Ohio River S. and G., 2nd pfd.	11-15-34	5	10	
Ohio River S. and G., 6's[46]	11-16-34	6	8	
Oregon P. C., com.[47]	11-21-34	5	10	
Oregon P. C., pfd.[47]	11-21-34	40	50	
Pacific Coast Aggr., com.[40]	11-15-34	....	5c	
Pacific Coast Aggr., pfd.[40]	11-15-34	....	10c	
Pacific Coast Aggr., 6½'s, '44[40]	11-15-34	16 F	18 F	
Pacific Coast Aggr., 7's, 1939[40]	11-15-34	3 F	5 F	
Pacific Coast Cement, 6's, 1937[40]	11-15-34	46	48	
Pacific P. C., com.[40]	11-15-34	2¾	3¼	
Pacific P. C., pfd.[40]	11-15-34	32	35	
Pacific P. C. 6's, 1935-1937[40]	11-15-34	101	102½	
Peerless Cement, com.[47]	11-21-34	¼	½	
Peerless Cement, pfd.[47]	11-21-34	1½	2	
Penn.-Dixie Cement, com.	11-21-34	4¼	actual sale	
Penn.-Dixie Cement, pfd.	11- 9-34	17½	19½	
Penn.-Dixie Cement, 6's A, 1941	11- 9-34	67	actual sale	
Penn. Glass Sand Corp., pfd.[47]	11-21-34	84	88	
Penn. Glass Sand Corp., 6's.	11-21-34	100	102	
Petoskey P. C., 6's, 1941[48]	11-15-34	72	....	
Petoskey P. C., 6's, 1935-1938[48]	11-15-34	72	....	
Petoskey P. C., com.[48]	11-15-34	1	2	
Republic P. C., 6's, 1943[47]	11-21-34	83	86	
Riverside Cement, A[9]	11-20-34	6½	7½	
Riverside Cement, B[9]	11-20-34	½	1	
Riverside Cement, pfd.[9]	11-20-34	81	85	
Rockland and Rockport Lime, 1st pfd.[47]	11-21-34	2	3	
Sandusky Cement 6's[47]	11-21-34	65	70	
Sandusky Cement 6½'s, 1932-37[47]	11-21-34	65	70	
Santa Cruz P. C., com.[9]	11-20-34	50	55	
Schumacher Wallboard, com.[47]	11-21-34	1	2	
Schumacher Wallboard, pfd.[9]	11-20-34	3	5	
Signal Mt. P. C., com.[47]	11-21-34	2	3	
Signal Mt. P. C., pfd.[47]	11-21-34	19	21	
Signal Mt. P. C., 6's, 1936[46]	11-16-34	97	100	
Southwestern P. C., units[10]	11-15-34	175	....	
Spokane P. C., 7% cum. pfd.[49]	11-15-34	8	....	
Standard Paving & Mat. (Can.) com.[12]	11-15-34	1	2½	
Standard Paving & Mat. pfd.[12]	11-15-34	10	15	
Superior P. C., A[40]	11-15-34	25	27	
Superior P. C., B[40]	11-15-34	4½	5½	
Trinity P. C., units[47]	11-21-34	22	27	
Trinity P. C., com.[47]	11-21-34	1	2	
Trinity P. C., pfd.[47]	11-21-34	20	25	
U. S. Gypsum, com.	11-17-34	45½	46⅝	.25 (qu.) Jan. 2; .25 ex. Dec. 24
U. S. Gypsum, pfd.	11-17-34	138	140	1.75 (qu.) Jan. 2, '35
Volunteer P. C., 1st 7's, 1942[49]	11-15-34	68	....	
Volunteer P. C., com.[49]	11-15-34	1¾	....	
Volunteer P. C. units[49]	11-15-34	38	58	
Vulcanite P. C., cap.[49]	11-15-34	1	5	
Vulcanite 7½'s 1943[49]	11-15-34	32	....	
Wabash P. C.[47]	11-21-34	6	8	
Warner Co., ww., 1st 6's[47]	11-21-34	30	35	
Warner Co., ex.w. 1st 6's[47]	11-21-34	25	30	
Warner Co., new com. ($1 par)	10-27-34	1¼	actual sale	
Warner Co. pfd. (sold at auction, Philadelphia)	3- 7-34	7½	actual sale	
Whitehall Cem. Mfg., com.[47]	11-21-34	30	35	
Whitehall Cem. Mfg., pfd.[47]	11-21-34	55	60	
Wisconsin L. & C., 1st 6's, 1940[47]	11-21-34	30	40	
Wolverine P. C., com.[47]	11-21-34	1	2	
Yosemite P. C., A., com[46]	11-16-34	1½	3	

Quotations by: [9]A. E. White Co. San Francisco, Calif. [12]James Richardson & Sons, Ltd., Winnipeg, Man. [14]Securities Co. of Milwaukee, Inc., Milwaukee, Wis. [37]Wise, Hobbs & Seaver, Inc., Boston. [40]Martin Judge, Jr., and Co., San Francisco, Calif. [42]Nesbit, Thomson & Co., Toronto. [46]First National Bank of Chicago, Chicago, Ill. [47]Anderson Plotz and Co., Chicago, Ill. [48]Hewitt, Ladin & Co., New York, N. Y. [49]Feldman & Co., Inc., Boston, Mass.

F—Flat.

Recent Dividends Announced

Alpha Portland Cement, 7% pfd. (quarterly)	$1.75	December 15, 1934
Lehigh Portland Cement, 7% cum. pfd. (quarterly)	.87½	January 2, 1935
Monolith Portland Cement, pfd.	.25	December 10, 1934
U. S. Gypsum, common (quarterly)	.25	January 2, 1935
U. S. Gypsum, common (extra dividend)	.25	December 24, 1934
U. S. Gypsum, pfd. (quarterly)	1.75	January 2, 1935

◆ ◆ ◆

Alpha Portland Cement Co., Easton, Penn., has announced that its entire issue of 20,000 shares of 7% preferred stock of $100 par will be redeemed February 1, 1935, at $125 a share plus accrued dividends through First National Bank and Trust Co., Easton.

◆ ◆ ◆

Iron City Sand and Gravel Co., Pittsburgh, Penn., bond holders propose a reorganization under the new federal bankruptcy act on the following lines: Company has outstanding $23,000 unpaid costs of prior receivership proceedings, $57,000 principal amount of 6% equipment trust certificates, $936,000 principal amount of first mortgage, sinking fund, 6% bonds, with unpaid interest to October 1, 1934, amounting to $131,040 and claims of unsecured creditors, $103,278. Outstanding stock of company consists of 3,412 shares of $100 par 7% cumulative first preferred shares, 89 shares of $100 par 8% preferred, 10,881 shares of $50 par 8% preferred, 7,289 shares of class A common and 12,350 shares of class B common stock.

The plan provides for formation of two new companies, an operating company formed under Pennsylvania laws and a holding company to be formed under laws of Maryland. The operating company would acquire all property of present company, and discharge above named unpaid costs of prior receivership proceedings, as well as any taxes or claims found entitled to priority by the court, and would also pay in full creditors having unsecured claims not exceeding $25. Should the plan be accepted by less than two-thirds of unsecured creditors, a sale of the property would be held with unsecured creditors receiving their pro rata share of proceeds of the sale. The equipment trust certificates would be reduced to $38,000 principal amount, by the operating company making pro rata payments aggregating $19,000 to holders thereof. The operating company would thus acquire title to all of company's assets, subject to existing lien on ten steel barges securing the balance due on the equipment trust certificates.

In consideration for acquisition of the property, the operating company would deliver to the holding company: a note for $936,000 plus interest from June 1, 1932, secured by a mortgage on all property in hands of trustees at time of transfer to operating company; existing insurance on the life of George Vang; and all of its capital stock. The operating company would deliver to unsecured creditors holding allowed claims of over $25 five-year non-interest bearing notes in principal amount equal to amount of such claims, unless such claims should be paid in cash due to non-acceptance of plan by holders of two-thirds of such claims. The operating company would assume payment of the remaining $38,000 principal amount of equipment trust certificates, to be amortized at rate of $700 per month, provided holders thereof would agree to extend the respective dates to January 1, 1940.

The holding company would issue $936,000 "6% collateral trust bonds—Iron City Series," secured by the mortgage notes and capital stock of the operating company, in exchange for the first mortgage 6% sinking fund bonds, 1940 of the present company on a par for par basis, and would offer bondholders, creditors and stockholders of present company, and the committee, the right to subscribe to common stock of the holding company.

In addition to the above new bonds, the holding company would issue, subject to consummation of a similar plan relating to Ohio River Sand & Gravel Co., $452,000 "6% collateral trust bonds—Ohio River Series," secured by a mortgage note from (and all capital stock of) a new company which would acquire, among other things, assets of the Ohio River Company; and/or $68,000 "6% collateral trust notes—Ohio River Dredge Series," secured by a mortgage note from (and all capital stock of) a new company which would acquire the equity in the dredge "George Vang," subject to $17,000 principal amount of equipment trust certificates secured by the dredge.

No provision is made in plan for any distribution to stockholders of present company, but for purpose of restoring to working capital the cash required for reorganization expenses the holding company would authorize issuance of its capital stock and would grant subscription rights therefor.

◆ ◆ ◆

Boston Sand and Gravel Co., Boston, Mass., reports for the quarter ended September 1 an increase in working capital of about $37,500. Paul P. Bird, president, reports: "Compared with 1933, the year 1934 will show a considerable improvement in earnings, and for this reason the company's officers feel quite encouraged. However, if the current year is compared with conditions as they were five or six years ago, when we were enjoying prosperity in the construction industry, we realize we are still operating at a very low rate. We are reasonably busy and are looking forward to fair business for the remainder of the year." The company's convertible 7% debenture bonds, due October 3, 1934, were extended to October 1, 1939.

Pacific Coast Cement Corp., Seattle, Wash., controlled by the Pacific Coast Co. and plant leased to the Superior Portland Cement Co., reports for the calendar year 1933: Net loss after expenses, taxes, depreciation, depletion, amortization, interest and other charges, $214,083, compared with $88,-972 loss in 1932.

Cement

Associated Portland Cement Manufacturers, Ltd., London, England: The British Government has plans to revive industry and assist the unemployed in "depressed areas." Two commissioners have been appointed, one to deal with England and Wales and the other with Scotland. They will organize development schemes and social improvements. Percy Malcolm Stewart, chairman and managing director of the Associated Portland Cement Manufacturers, Ltd., is responsible for England and Wales. Mr. Stewart was a visitor at one of the Portland Cement Association meetings several years ago when British cement manufacturers were planning promotional work along American lines.

◆ ◆ ◆

International Cement Corp., New York City: R. A. Hummel, vice-president, has been in Porto Rico recently investigating the possibilities of establishing a cement plant there.

◆ ◆ ◆

TVA Contract: Dr. Arthur E. Morgan, chairman of TVA and president of Antioch College, Yellow Springs, Ohio, recently interviewed there, gave the following explanation of his cement contract, according to the *Springfield (Ohio) News:* Dr. Morgan said that in several test cases so far the TVA has demonstrated the feasibility of open dealings between government and private industry. "When we came to need cement in large quantities on our construction work we sought to find a fair price to be paid. Our notions were somewhat at variance with those of the cement industry. But instead of calling each other names, we sat down in an intelligent spirit of fair play and studied costs of production in order to arrive at a fair price. The Portland Cement Institute coöperated with us to determine this fair price and opened their books for our guidance," Dr. Morgan said. "We later received a letter from the leaders of the industry saying that in their memory this was the first time that government and private industry had fairly coöperated and opened complete records in friendly effort to reach such a just end." Having demonstrated the practicability of such joint study between government and private industry, Dr. Morgan said, the TVA is now hoping to apply this policy of intelligent, disinterested mediation in other fields. He said that overtures to this end had already been made to the coal industry, which has been least friendly to TVA.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of November 24:

New England

34303. **Stone,** crushed, not coated, in bulk, in gondola or other open top cars, (See Note 3), from Meriden, Conn., to Worcester, Mass. Proposed—$1.10 net ton. Present—$1.25 net ton. Reason—To provide rates on same basis as rates from other producing points.

Trunk

32953. **Sand,** other than blast, engine, filter, fire, foundry, glass, moulding, quartz, silex or silica, when loaded in open top equipment (does not apply on sand processed beyond washing or screening for decolorizing, filtering or water softening); **gravel,** when loaded in open top equipment, C. L., (See Note 2), from South Jersey Group 1, as shown in C. R. R. of N. J. I. C. C. G-3981, to Modena to Embreeville, Penn., incl.; Glenhall, Penn., to Winterthur, Del., incl.; Rockland to Delaware River Pier, Del., incl., $1.10 per net ton. Reason—Proposed rates are comparable with rates on like commodities from and to points in the same general territory.

32964. To cancel rates on **lime, agricultural, chemical, gas, glass** and **ground limestone;** also **lime (calcium) carbonate of; recarbonated waste (whiting substitute)** and **precipitated lime,** C. L., from Johnsonburg, Penn., to destinations in Trunk Line and New England territories as contained in the following tariffs:

Erie R. R. G. O. 2948-A, I. C. C. 17340.
Erie R. R. G. O. 2949-A, I. C. C. 18758.
B. & O. (B. R. & P.) R. R. A-5338, I. C. C. 7972.
B. & O. (B. R. & P.) R. R. A-5733, I. C. C. 8287.

Penn. R. R. 1275-A, I. C. C. 204, except rate of 9½c per 100 lb. on precipitated lime between Johnsonburg, Penn., and Lock Haven, Penn. Reason—Investigation develops no traffic has moved for some time and no prospect of future movement, therefore, rates are obsolete.

32966. **Limestone,** viz., crude, fluxing, foundry and furnace, when shipped in open top equipment, C. L., (See Note 2), from Inwood, W. Va., to Beaver Falls, Bridgeville, Burgettstown, Carnegie, Economy, Penn., Follansbee, W. Va., McDonald, Midland, Monessen, Penn., Steubenville, Ohio, Toronto, Ohio, Weirton, W. Va., and Woodville, Penn., $1.26 per gross ton. Reason—Proposed rate is comparable with rate from Williamson, Penn.

32975. **(A) Sand, building, C. L. (B) Sand, blast, engine, foundry, moulding, glass, silica, quartz or silex,** C. L., (See Note 2), from Mapleton District, Penn., to Hancock, N. Y. (A) $2.50 and (B) $2.75 per net ton. Present rate, 6th class. Reason—Rates comparable with others involving similar distances.

32978. **Sand,** other than blast, engine, filter, foundry, moulding, glass, silica, quartz or silex, in open top cars, (See Note 2), from South Jersey Sand Shipping Stations to Easton, Bethlehem and Allentown, Penn., $1.30 per net ton. Reason—Rate comparable with rates from other points of origin in the same general territory.

32991. Establish commodity on **sand,** other than blast, engine, foundry, glass, loam or moulding, and **gravel,** C. L., **crushed stone** and **crushed stone screenings, coal ashes** and **coal cinders,** and **crushed slag,** from Cumberland, Md., and various Pennsylvania points to Grantsville, Jennings and Bittinger, Md., stations on the Castleman River R. R., rates ranging from 90c to $1.40 per net ton.

32698. **Silica sand,** C. L., (See Note 2), from South Jersey Group 1 and 2 stations to Niagara Falls, Ont., and Thorold, Ont., rate $3.20 per net ton.

33011 **(A) Gravel and sand** (other than blast, engine, fire, foundry, glass, moulding or silica). **(B) sand** (blast, engine, fire, foundry, glass, moulding or silica), in straight or mixed carloads, and **gravel,** C. L. (see Note 2), from Walnutport, Penn., to Palmerton East, Penn. A) 70c and (B) 72c per net ton. Present rate, 6th class. Reason—Proposed rates are same as currently in effect from Slatington, Penn.

32975. **(A) Sand, building, C. L. (B) Sand, blast, engine, foundry, moulding, glass, silica, quartz or silex,** C. L. (see Note 2), from Hancock-Berkeley Springs district to Hancock, N. Y. (A) $2.50, and (B) $2.75 per net ton.

Central

41244. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), and gravel, C. L., from Peru, Ind., to Pleasant Mills, Ind., rate of 100c per net ton. Present, 14c (sixth class).

41308. To cancel rates on **sand and gravel,** in straight or mixed C. L., from Gravel Pit, O., to destinations in Kentucky, published in N. & W. Ry. Tariff 623, account obsolete.

41311. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), and gravel, C. L., from Jonesville, Mich., to Augusta, Mich., rate of 80c per net ton. Present rate, 13c (sixth class).

41317. To establish on **stone, fluxing, furnace or foundry, melting** and/or **refractory** (unburned), in bulk in open top cars, C. L., from Limestone, O.

To	*Prop.	†Pres.
Canton, O.	92	18
Massillon, O.	92	17
Cleveland, O.	92	16
Mingo Junction, O.	105	20
Steubenville, O.	105	20
Wheeling, W. Va.	105	20
Bellaire, O.	105	20
Youngstown, O.	105	19
Mansfield, O.	88	15

*In cents per gross ton.
†In cents, class rates.

41318. To establish on **limestone,** agricultural (not ground or pulverized) (in bulk in open top cars only), and **screenings agricultural, limestone,** C. L., from Limestone, O., to points in Ohio, rates as shown in Exhibit A attached. Present rates, sixth class as shown in Exhibit A attached.

EXHIBIT A

(Rates in cents per net ton, except as noted.)

FROM LIMESTONE, OHIO

To Representative Points:	Prop.	*Pres.
Beach City, O.	115	18
Bellevue, O.	60	12
Bowerston, O.	125	18
Bowling Green, O.	80	12
Bucyrus, O.	95	14
Burton City, O.	105	17
Carrollton, O.	135	18
Chagrin Falls, O.	115	17
Clarksfield, O.	85	14
Cleveland O.	95	16
Conesville, O.	125	18
Coshocton, O.	125	18
Creston, O.	100	15
Dell Roy, O.	125	18
Findlay, O.	85	13
Fostoria, O.	80	12
Hartville, O.	125	18
Huron, O.	90	13
Kent, O.	115	18
Mansfield, O.	100	15
Massillon, O.	115	17
Middle Branch, O.	125	18
Milan, O.	85	13
Norwalk, O.	80	12
Sonnenberg, O.	105	17
Spencer, O.	95	15
Tiffin, O.	80	12
Zanesville, O.	135	19

*Sixth class, in cents per 100 lb.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

41454. To establish on **stone,** viz., quarry scrap and rip rap, in open top cars, in straight or mixed carloads, from Spencer and Romona, Ind. (Rates in cents per net ton.)

To	Pres.	Prop.
Effingham, Ill.	340	113
St. Elmo, Ill.	360	126
Via P. R. R. direct.		

41455. To establish on **crushed stone,** in open top cars, C. L., will apply from Spencer, Ind. (Rates in cents per net ton.)

To	Pres.	Prop.
Freedom, Ind.	60	40
Worthington, Ind.	63	40
Via P. R. R.		

41463. To establish on **stone,** rough, undressed, C. L., minimum weight 70,000 lb., from Bedford, Ind., district to Brockville, Ont., Canada, rate of 42c. Present, 43c.

41483. To cancel rates on **stone,** fluxing, rip rap, quarry, rubble, bridge footing, dressed, sawed, crushed, screenings and natural (other than bituminous asphalt rock, granite, jasper, marble or onyx), dolomite, crude or raw, agricultural limestone, unburnt, and limestone, ground or pulverized, from Centerville, O., to various C. F. A. destinations, published in the following tariffs: P. R. R. Tariff 124-B—Stone, to points in C. F. A. territory. P. R. R. Tariff 127—Crushed stone, to points in Ohio. P. R. R. Tariff 127-A—Crushed stone, to points in Ohio. P. R. R. Tariff 130—Agricultural limestone, to points in Ohio. Account obsolete, classification basis to apply in lieu thereof.

41427. To establish on **sand** (except blast, core, engine, fire or furnace, foundry glass, grinding or polishing, loam, moulding or silica) and gravel, C. L., from R. A. Junction, O., to Waverly, O., rate of 60c per net ton, to expire June 30, 1935. Present—10c (6th class).

41489 (cancels W. D. A. 40360)—To establish on **stone,** crushed, slag, and/or gravel, coated with oil, tar or asphaltum (see note) in open top cars. C. L. (see Note 3), from Marble Cliff and West Columbus, O., to points in Virginia, West Virginia and Kentucky, rates on basis of the Martinsburg, W. Va., single or joint scale. Present—On basis of 16% of the 15879 first class rates.

Note—The oil, tar and/or asphaltum not to exceed 10% by weight of the commodity shipped, the shipper to so certify on shipping orders or bill of lading.

Southern

6560. **Limestone, ground or pulverized,** C. L., Dugan, Ky., to Burlington, Ia. Present rate, $4.70 per ton of 2000 lb. (East St. Louis, Ill., combination). Proposed rate on limestone, ground or pulverized, minimum weight 60,000 lb. from Dugan, Ky., to Burlington, Ia., $3.60 per ton of 2000 lb.

6580. **Stone, crushed,** C. L., Boxley, Va., to Willow Grove, Plantation, Dalby's Hunt's, Capeville, Cedar Grove, Townsend, Latimer's, Dixon's, and Kiptopeke, Va. (Penn. R. R.). Present rate, 150c per ton 2000 lb. Proposed rate on stone, crushed, C. L., (See Note 3), from and to the above named points, 140c per ton 2000 lb.

6744. **Limestone,** ground or pulverized, C. L., Dugan, Ky., to Terre Haute, Ind., Louisville, Ky., combination now applies. Proposed rate on limestone, ground or pulverized, C. L., minimum weight 60,000 lb., from and to points mentioned above, 280c per net ton. Made with relation to rates that have been approved from this point to other C. F. A. destinations.

6745. **Limestone,** ground or pulverized, C. L., Dugan, Ky., to Mt. Vernon, Ind. It is proposed to establish reduced rate of 165c per net ton on limestone, ground or pulverized, C. L., minimum weight, 60,000 lb., from Dugan, Ky., to Mt. Vernon, Ind. Made in line with existing rate from Dugan, Ky., to Evansville, Ind., E. St. Louis, Ill., and St. Louis, Mo.

6805. **Crushed stone,** C. L., Dugan, Ky., to Fordsville, Ky. (intrastate). Present rate 70c per net ton. Proposed rate on crushed stone, carloads, (See Note 3), from Dugan to Fordsville, Ky., for intrastate application, 55c per net ton, to expire with February 1, 1935, unless sooner canceled, changed or extended. Proposed for the purpose of enabling shippers at Dugan, Ky., to compete with roadside quarries.

Western

E-41-42—Rates: **Sand, gravel** and **stone,** crushed, C. L., (See Note 3), but not less than 40,000 lb., from Louisville, Weeping Water and Nehawka, Neb., to Hiawatha,

Kan. Rates: Present—From Louisville, Neb., $1.20 per net ton. From Nehawka, Neb., $1.10 per net ton, and from Weeping Water, $1.10 per net ton. Proposed—90c per net ton of 2000 lb., to expire with June 30, 1935.

D-54-6—Rates: **Sand, silica,** C. L., minimum weight 50,000 lb., from Klondike, Mo., to Belleville, Ill. Rates: Present—137c per net ton (E. St. Louis, Ill., combination, based 82c per net ton to E. St. Louis per M.-K.-T. Tariff 3704-M, I. C. C. 590, and 55c per net ton beyond per Southern Ry. Tariff 11171-H, I. C. C. 2098). Proposed—$1.25 per net ton of 2000 lb.

C-54-2. **Sand,** silica, C. L., from points in the Ottawa, Ill., district, to New Albany, Ind., and Louisville, Ky., failed of adoption.

Southwestern

4270. **Sand, silica,** from Illinois and Missouri points to Rio Grande crossings destined Mexico. To establish the following rates in cents per 100 lb. on silica sand, carloads, to Brownsville, Eagle Pass, El Paso and Laredo, Tex., on traffic destined all points in Mexico, and to Presidio, Tex., on traffic destined to Chihuahua and Tabalaopa, Chih., Mexico.

From Klondike and Pacific, Mo., $4.35; La-Salle, Ottawa, Utica and Weldon, Ill. (a), $5.21; (b) $5.22.

(a) In open top equipment.
(b) In box cars.

Texas-Louisiana

9436-TX. (Proposal 1056-TX. **Crushed stone,** C. L., from Maryneal and Sweetwater, Tex., to P. & S. F. stations, Post to Southland, Tex., and points intermediate therewith: Proposition from shippers to establish rate of 70c per ton of 2,000 lb. on crushed stone, C. L., (See Note 3). The State Highway Department has let contract for construction of 16 miles of highway between Post and Southland, Texas, and approximately 10,700 tons of crushed stone will be used. Rock suitable for this construction work is available from wayside quarries, delivered on the job by trucks at a cost per cubic yard of approximately 72c. In connection with the rail haul movement there is still the additional expense of trucking from cars to the job.

8418-5-TX. **Sand and gravel,** straight or mixed, C. L., from T. & P. interchange at Dallas, to apply on shipments originating June Spur and Cloudy on T. & P., destination Reinhardt, Tex.: Proposition from carriers to establish rate of $12.50 per car on sand and gravel, straight or mixed C. L., from T. & P. interchange at Dallas, to apply on shipments originating June Spur and Cloudy on T. & P., destination Reinhardt, Texas. To expire 90 days from effective date. The distance from T. & P. interchange at Dallas to Reinhardt, Texas, is 6.6 miles—the proposed rate of $12.50 per car is necessary to meet movement via truck from T. & P. team tracks, East Dallas, as well as from team tracks other lines same vicinity to which switching charges from T. & P. is $6.50 per car.

Illinois

7906-1. Agricultural limestone, ground or pulverized in bags, barrels or in bulk, C. L., from Quincy, Ill., to Krause, Ill. Present—Class or lowest combination. Proposed—$1.25 per net ton.

I. C. C. Decisions

25220. Crushed Stone. By the commission. American Lime and Stone Co. vs. Pennsylvania Railroad. Carload rates on ground or pulverized limestone from Martinsburg, Millville and Engle, W. Va., to points in New Jersey, Delaware, Maryland, Pennsylvania, West Virginia, and the District of Columbia found unreasonable. Reasonable rates prescribed and reparation awarded. Rates from Lime Crest, N. J., on crushed stone, to points in trunk-line territory and on ground or pulverized limestone to points in trunk-line and New England territories found unreasonable and reparation awarded—but rates on ground or pulverized limestone in carloads from Lime Crest to points in central territory found not unreasonable. Rates on ground limestone in carloads from Bellefonte and Pleasant Gap, Penn., to points in New York State found unreasonable. Reasonable maximum rates prescribed.

25743. Crushed Stone. By the commission. State Highway Commission of Missouri vs. Atchison, Topeka and Santa Fe Railway Co. Railroad rates from Sugar Creek, Mo., to Missouri destinations over interstate routes, during period from August 1, 1930, to October 12, 1931, found not unreasonable. Complaint dismissed.

13071. Lime. Fourth Section. By the commission. Conditional authority granted to establish and maintain rates on lime in carloads from central territory points and also from Buffalo, N. Y., to destinations in the territory without observing the long-and-short-haul provision.

25346. Lime. Pittsburgh Generator Company, Inc., vs. B. & O. Railroad Co. By division 3. Carload shipments of lime from Capon Road, Oranda, Va., to McKeesport, Penn., were found to have been "chemical lime" and subject to the commodity rate maintained on common lime, hydrated, quick or slaked. Complaint dismissed.

26073. Sand. Olean Glass Co., Inc., vs. Pennsylvania Railroad Co. By division 3. Rates on glass sand in carloads from Mapleton, Penn., to Olean, N. Y., found unreasonable and reparation awarded.

3973. Cement. By the commission. Proposed rates on cement in straight or mixed carloads from El Paso, Tex., to destinations on the Southern Pacific lines in New Mexico found not justified and proceedings discontinued.

15507. Cement. Fourth Section. By the commission. Authority granted conditionally to establish and maintain rates on cement in carloads from Limedale, Mitchell and Speeds, Ind., to points in Iowa, Kansas, Nebraska and northern Missouri without observing the long-and-short-haul provision.

26078. Mortar. Washington Building Lime Co. vs. B. & O. Railroad Co. By division 3. Interstate rates charged on dry mortar in carloads from Martinsburg, W. Va., to Pittsburgh, Munhall, McKees Rocks, Aliquippa and West Liberty, Penn., Washington, D. C., and Millville, W. Va., found unreasonable. Reparation awarded.

24626. Cement. Lone Star Cement Co., Alabama, vs. Atchison, Topeka and Santa Fe Railway Co. By division 4. Upon further hearing amount of reparation due complainant under previous report. On shipments of cement in carloads from Spocari, Ala., to points in Missouri, Oklahoma, and Texas determined and ordered paid.

15413. Cement. Fourth Section. By division 2. From Laramie, Wyo., to Colorado: Parties to Boyd's I. C. C. No. A-2033 authorized to conditionally disregard long-and-short-haul provisions of Section 4, subject to circuity limitations.

26138. Sand and Gravel. L. G. Everist, Inc., vs. C. & N. W. By division 3. After consideration of a complaint alleging undue prejudice in rates from Hawarden, Iowa, to points in northeastern Nebraska proceeding order held in abeyance for 60 days, pending suggested negotiations for removal of cause of complaint. Unwarranted discrimination against complainant charged. Rates assailed were established by railroad to meet truck competition from local sand and gravel pits and held in place by orders of the Nebraska commission.

26098. Sand. International Motor Co., vs. H. & H. By division 3. Reparation of $677.29 awarded on finding rates, core sand, from Davisville and Fox Point, R. I., to New Brunswick, N. J., unreasonable to the extent they exceeded $2.95 from Davisville and $3.15 a net ton from Fox Point; molding sand from Elnora, N. Y., to the same destination, to the extent that the rate exceeded $2 a net ton. Chairman Lee dissented.

23560. Sand. Dayton Steel Foundry Co. vs. B. & O. By the commission. Reparation due under findings of unreasonableness as to the rate on sand from the Ottawa, Ill., district to Dayton, Ohio, determined to have been $4308.83 on shipments moving in the 2-year period listed. Reparation ordered.

Proposed I. C. C. Decisions

26176. Lime. Dekle Lumber Co. vs. A. & W. P. By Examiner R. L. Shanafelt. Rates from points in Ohio to Jacksonville, Fla., held not unreasonable but unduly prejudicial to complainants at Jacksonville and preferential to competitors at Tampa and other Florida points. No reparation recommended.

Industrial Sand Cases

THE INTERSTATE Commerce Commission announced in November that all cases now awaiting settlement as to the amount of reparation under the I. C. C. findings of October 4, 1932, in "industrial sand cases 193188-99" are scheduled for further hearing—but no sooner than April 1, 1935.

From that date on, the cases will be continued until they are all disposed of and the reparation amount determined in each individual case. Complainants all have been notified that not later than February 14, 1935, they are required to furnish special statements to the railroads from which they are seeking reparation.

Protest New Lime Rate

THE Traffic Association of Birmingham, Ala., has filed a petition with the Interstate Commerce Commission to prevent proposed advances in freight rates on lime from Alabama producing centers to Louisiana Texas, Arkansas, Oklahoma and parts of Missouri and Kansas.

The new rates originally were to become effective June 4. Their suspension for six months was asked in order that the commission might investigate their reasonableness.

Seek Change in South Carolina Aggregates Rate

THE SEABOARD Airline joined with other railroads in November at Washington, D. C., in presenting to the Interstate Commerce Commission a petition for modification of orders relating to the shipment of sandstone and gravel in South Carolina. The Commission was told that orders are needed to provide an immediate rate of 55c a ton from Norworth Siding near Hartsville on shipments to nearby destinations.

Competition from motor truck traffic is given as the reason which justifies the change. Otherwise, according to the railroads' contention, all business in aggregates will be lost to motor trucks.

Lime Producers' Forum

Conducted by Victor J. Azbe,
Consulting Engineer, St. Louis, Mo.

Gasifying Wood in Producers

Of course, American plants do not use much wood for lime burning but at one time many kilns were wood fired and in almost no case satisfactory efforts were made to obtain efficient results. Wood is a peculiar fuel. It will generate combustible gas faster than one is able to supply air for its combustion. As a result, almost all wood fired kilns suffer from a very high loss due to incomplete combustion.

In view of this an article in the July, 1934, issue of *Engineering and Mining Journal*, by Vincent Biava, is interesting as it describes a lime plant in Ecuador, South America, where sawdust and waste wood are gasified in a producer and gas piped to a lime kiln. The operation is small and more intricate than appears to be necessary, but it is profitable, none the less, as imported lime costs $86.80 a ton.

As with wood there would be no clinkering, wood gas producer construction and operation would be very simple. They would not be much more than large, deep brick chambers located close to the kiln to which air admission and consequently gasification would be regulated. If these producers would be amply deep, no fans would be needed and operation would be of the simplest.

* * * *

Production Data

Statistics collected by the Trade Relations Committee of the National Lime Association for the months of April, May and June are as follows:

1934—	Agriculture Tons	Agriculture Per ton	Building[2] Tons	Building[2] Per ton	Chemical Tons	Chemical Per ton	Total Tons	Total Per ton
April—								
Quicklime—Bulk	2,030	$ 5.59	4,900	$ 8.14	70,925	$ 6.06	77,855	$ 6.18
Barrels	367	17.09	4,333	16.97	857	16.36	5,557	16.88
Bags	3,548	7.77	3,298	12.18	3,405	9.02	10,251	9.60
Hydrate	26,990	8.42	14,476	8.89	20,722	8.08	62,188	8.41
Total	32,935	$ 8.27	27,007	$10.45	95,909	$ 6.70	155,851	$ 7.68
May[2]—								
Quicklime—Bulk	1,490	$ 5.69	3,907	$ 8.12	81,711	$ 6.10	87,108	$ 6.19
Barrels	704	17.50	4,019	17.27	901	16.90	5,624	17.24
Bags	2,990	7.93	3,643	12.07	4,195	8.97	10,828	9.73
Hydrate	26,392	8.52	14,560	8.98	22,503	8.28	63,455	8.54
Total	31,576	$ 8.53	26,129	$10.56	109,310	$ 6.75	167,015	$ 7.68
June—								
Quicklime—Bulk	442	$ 6.23	3,704	$ 8.19	67,035	$ 6.25	71,181	$ 6.35
Barrels	600	18.65	4,117	16.30	785	18.56	5,502	16.88
Bags	513	9.29	3,493	11.88	3,350	9.07	7,356	10.42
Hydrate	12,444	8.86	14,694	9.00	23,359	8.23	50,497	8.61
Total	13,999	$ 9.21	26,008	$10.43	94,529	$ 6.94	134,536	$ 7.85

[1]All data relate only to competitive lime. Table 2 does not include the following Miscellaneous Lime: April, 3,136 tons; May, 3,595 tons; June, 2,915 tons.
[2]Buiding hydrate includes no finishing lime.
[3]Revised.

Fan Standard for Kiln Size

An inquiry was received from one of the leading fan manufacturers worded like this: "Is there a definite relation between fan capacity required and kiln output?" One would think that there would be such a relation, but unfortunately there is not; every application is different and conditions may be so extremely variable that in one case the fan may have to handle four times the volume than in another. What the extremes may be is shown below.

(1) Temperatures of the gas may be only 150 deg. F. right after charging up to 1200 deg. in the morning before charging. On high calcium lime kilns temperatures may be almost always higher than on dolomitic lime kilns.

(2) The volume of the gas per tons of lime will depend on temperature, fuel ratio and excess air. Excess air coming through the kiln will ordinarily be much less than 100% and there may be close to no excess air. However, ordinarily tremendous volumes leak in around the charging door on top and in this way leakage gas may amount to twice the volume of kiln gas.

(3) Fan has to handle the CO_2 from the stone. The greater the kiln efficiency the more CO_2 from the stone there will be in proportion to combustible gases, and kiln efficiencies vary from below 30% at their worst to over 80% at their best.

(4) A suction of a half-inch of water pressure may be ample in one case and in another 6 in. may be required, and this in itself depends upon some half a dozen different factors, as rate of driving, amount of excess air, kiln ability to utilize the heat, size of stone, tendency of lime to break up, etc.

So we see that there can be no standard with temperatures anywhere up to red heat, volume from theoretical to several times this figure, and suctions necessary from a very mild half-inch to the whistling 6 in. Every case has to be estimated separately, otherwise best results will not be obtained, or they may even be damaging. When the gas feed to the kiln is constant and the fan, for reasons of excess temperature, is not capable of drawing enough air through the kiln, incomplete combustion will be the result. The gases coming up through the kiln will be high in carbon monoxide. This combustible gas if hot may ignite when it gets the leakage air coming in through the charging gate at the top, and then things will happen, the gross result of which will be that the flame rushing through the fan may so damage it that a new fan may have to be purchased. Secondary combustion such as this is often noted on old-fashioned open-topped kilns when flame is seen to stretch ten or more feet to the sky, but it must never occur when the top is closed in and all the gases have to pass through the fan.

* * * *

The Ratio of Kiln Masonry to Shaft Space

Some plants have kilns 18 by 18 ft. square within which there is a minute shaft 4½ by 8 ft. square, there being 89% of masonry and only 11% of working space. These kilns look like defense towers of some medieval fortress.

There are other kilns whose area will be only 140 sq. ft. containing a shaft of 60 sq. ft. of masonry and useful space 42%.

Then there are still other kilns—of mixed-feed type—in some few chemical plants, where the masonry is only about 35% and shaft space 65%.

This ratio of masonry to shaft space is important when considering the building of new kilns as masonry is costly and does no work while shaft space costs in itself nothing and is revenue producing. For this reason there is now a tendency when building kilns with oblong shafts to make the shells oval, which results in both a considerable saving of steel as well as brick.

Month	Total capacity represented, Short tons	Total shipments reported, Short tons	Average value per ton	Ratio Shipments to Capacity, Per Cent: United States	Lime manufacturing districts: 1	2	3	4	5B	6–8–9	7	10–11	12	13	14	15
1934—																
April	391,860	158,987	$7.66	40.5	24.4	55.4	53.0	50.7	38.9	29.2	43.7	39.1	44.9	26.5	24.8	20.4
May[2]	397,365	170,610	7.68	42.9	26.9	53.6	62.8	49.4	37.3	28.7	49.8	46.7	36.8	28.7	25.1	23.0
June	396,174	137,451	7.88	34.6	23.8	32.1	49.0	46.3	30.4	25.5	45.4	32.7	34.1	30.4	31.3	18.6

[1]All data relate only to competitive lime. Total capacity under Table 1 includes the following capacity reported as idle: April, 3,564 tons; May, 6,397 tons; June, 7,152 tons.
[2]Revised.

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Code Developments

NEW INTERPRETATIONS, rulings and appointments made in connection with code administration, in addition to those outlined on pages 28 and 29 of this issue, are summarized here. They include the latest code news for the concrete pipe, ready-mixed concrete and concrete masonry industries.

Concrete Masonry Industry: Amendments approved October 10, 1934. Article II, section 1, is amended to include under the definition of the industry, any branches or subdivisions of the industry which may from time to time come under the provisions of the code. Article III, section 2 (*c*) is amended to permit watchmen in plants not in operation, to work 63 hours per week. Article III is amended by adding a new section, section 7, which permits the establishment for a given area, by mutual agreement between employers and employes, of standards as to maximum hours, minimum rates of pay and other conditions of employment, provided that these agreements shall not be less favorable to employes than the provisions established in the Code. Article IV, section 2 (*d*) is amended to prohibit involuntary payments by employes for pensions, insurance, or sick benefits unless required by law. A new section, section 3, is added to this article permitting the employment of handicapped persons under certain conditions. Other provisions added to the Code by the amendments prevent reclassification of labor through subterfuge, improper dismissal of employes, and secret rebates and commercial bribery. The provisions relating to price listing have been revised to make such lists available for the inspection of all interested parties and provisions relating to the administration of the Code clarified.

FACTS—The Code provides in article II, section 1, as follows: "Industry.—The term 'Industry' as used herein includes the manufacture, and sale by those who manufacture, of block, brick, or tile building units made of portland cement concrete, primarily for structural use."

The Code provides in article II, section 4, as follows: "Member of the Industry.—The term 'Member of the Industry' as used herein includes anyone engaged in the industry as above defined, either as an employer or on his own behalf."

QUESTION—(*a*) Are manufacturers of concrete masonry units, who do not offer industry products for sale, but use the material of their own manufacture for their own use, members of the industry?

INTERPRETATION—Anyone engaged in the industry as defined in section 1 of article II is a member of the industry, whether or not he offers industry products for sale or sells such products.

FACTS—Many of the provisions of the Code relate to sales and trade practices, whereas other provisions of the Code relate to hours, wages, and working conditions of employes.

QUESTION—(*b*) If so, are they (those who manufacture but do not sell industry products) subject to all the provisions of the Code?

INTERPRETATION—Since this is a Code of Fair Competition for the industry and is binding upon every member thereof, every member of the industry, as defined in the Code, is subject to all the provisions of the Code. However, if a given provision covers a function in which a certain member of the industry is not engaged, then that provision is not applicable to that member and, accordingly, members of the industry who do not engage in sales are not subject to the provisions of the Code relating to sales and trade practices. However, every member of the industry is subject to every applicable provision of the Code; and in the case of a member who does not engage in sales and trade of commodity, such member would be subject to the labor provisions and all other provisions of the Code except those relating to functions in which the given member is not engaged.

FACTS—The basis of assessment approved by the Administrator on June 28, 1934, is as follows: "The basis of assessment shall be one-half of one per cent (½ of 1%) of the total current gross yard or plant sales of industry products for the calendar year 1934, payable on a quarterly basis."

QUESTION—(*c*) Are they (members of the industry who do not sell industry products) subject to our approved method of assessment and must they pay their proportionate share of the administration of the Code Authority.

INTERPRETATION—Since the basis of assessment relates to sales of industry products, a member of the industry manufacturing but not selling industry products, under the present approved basis of assessment, would not be required to pay his proportionate share of the administration of the Code Authority.

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Ready-Mixed Concrete Industry: Trade practice complaints committee approved: J. E. Burke, 10th and Duquesne Way, Pittsburgh, Penn.; H. F. Thomson, Buder Bldg., St. Louis, Mo.; Stanton Walker, 951 Munsey Bldg., Washington, D. C.; P. F. Ayer, 118 First St., Cambridge, Mass.; F. C. Brown, 407 Wilson Lane, Bethesda, Md.

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Concrete Pipe Industry: Trade practice complaints committee approved: C. H. Bullen, Mid-West Concrete Pipe Co., Franklin Park, Ill.; H. R. Swartley, Jr., Atlantic Cement Products, Inc., Hicksville, L. I., New York; C. F. Buente, Concrete Products Co. of America, Diamond Bank Bldg., Pittsburgh, Penn.; R. S. Lander, Shearman Concrete Pipe Co., Little Rock, Ark.; Ernest F. Bent, American Concrete & Steel Pipe Co., Los Angeles, Calif. (Approval conditional on certain changes.)

ASHLAR TREND

Concrete masonry manufacturers are giving increased attention to the widening market for modern ashlar units. Here is shown the fine, even texture of cinder oscillated block

Development in Fine Grinding

AN INTERESTING STEP toward simpler apparatus for fine grinding rock products has been made by the Raymond Bros. Impact Pulverizer Co. in a new type roller mill which combines the patented "whizzer," or fan blades of the company's mechanical air separator with the mill itself, thus eliminating a separate air separator. The details of the new mill are shown in the accompanying cross-section.

The whizzer blades operate on a vertical shaft in an air drum above the mill elements. These create a stilling or back draft effect on the blower circuit at the top of the mill housing, throwing down the coarser particles, directly into the grinding elements of the mill. Ordinarily, of course, this separation is made in a separate unit and the coarse material returned to the mill through the feed spout.

The size of the material removed from the mill can be governed, as in any air separator, by the speed of the whizzer blades, or the volume of circulating air, or both. The whizzer blade drive is separate from the mill drive, through a variable speed transmission and an individual motor. It is claimed that such a wide range as 80% minus 100-mesh to 99¾% minus 325-mesh is possible through this adjustment. Hence, the same mill may readily be used for a variety of commercial products merely by changing the speed of the whizzer blades.

Tests on Pulverized Limestone

An Eastern producer of pulverized marble has supplied the following data on a number of test runs performed with this new mill:

TEST NO. 1

A Whizzer speed (not running)	Through	50-mesh,	96.0%
Feed, fine (refer to general data)	Through	80-mesh,	87.0%
Tons per hour, 13.35	Through	100-mesh,	81.5%
Fan power load, 35.36	Through	200-mesh,	63.0%
67.7 hp. on mill	Through	325-mesh,	47.5%
B Whizzer speed (not running)	Through	50-mesh,	94.0%
Feed, coarse (see general data)	Through	80-mesh,	85.5%
Tons per hour, 8.5	Through	100-mesh,	79.5%
Fan power load, 36 kw	Through	200-mesh,	60.0%
	Through	325-mesh,	45.0%

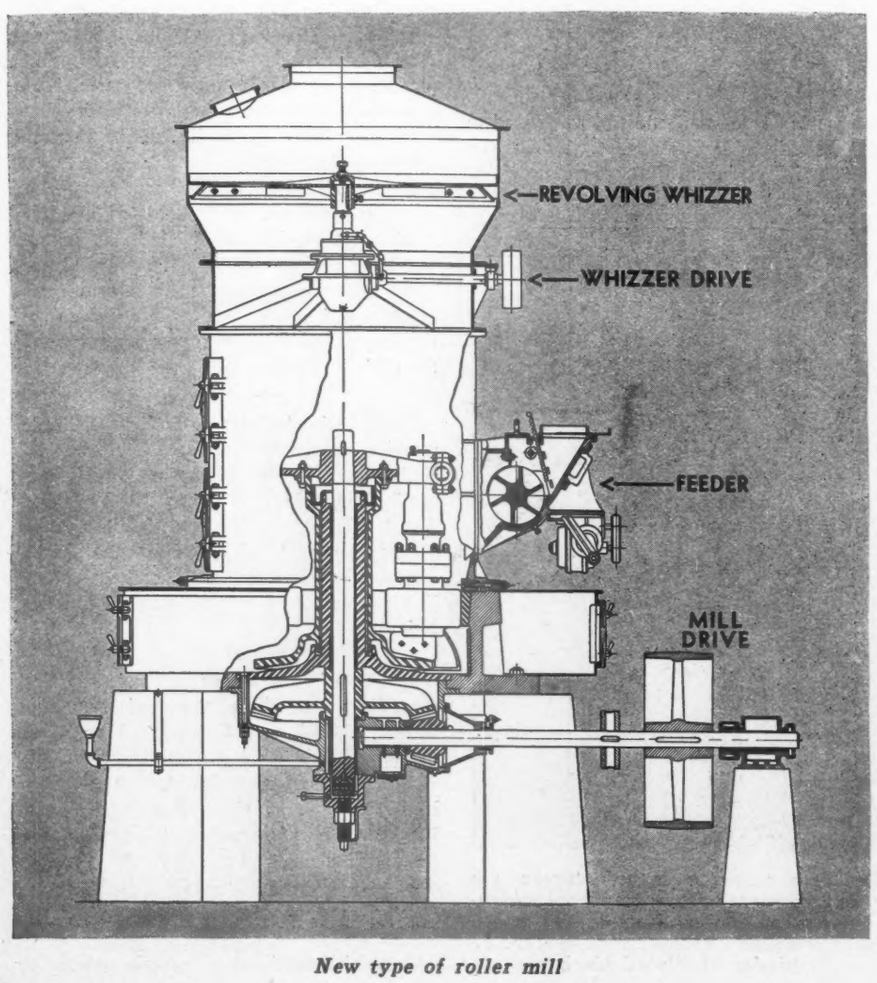
C To determine fan load with whizzer not running and mill not operating:

Tons per hour, none.
Fan power load, 42.5 kw.
Screen analysis, nothing.

These data indicate that more power is required to run the fan alone than with mill operating and handling material; the reason probably is that with mill not operating, the fan is handling a greater amount of air.

TEST NO. 2

Whizzer speed, 144 r.p.m.	Through	50-mesh,	97.5%
Feed, fine (see general data)	Through	80-mesh,	92.3%
Tons per hour, 10.4	Through	100-mesh,	89.0%
Fan power load, 29.6 kw	Through	200-mesh,	75.7%
	Through	325-mesh,	64.2%



New type of roller mill

EQUIPMENT—One five-roller Raymond mill with sheet metal side section, containing 5-ft. diameter whizzer separator. The whizzer separator has 48 whizzer blades with a gear ratio between horizontal and vertical shaft of 2 to 1. The mill is equipped with diaphragm journals having 7½-in. face rolls; a No. 11 fan with 42-in. diameter wheel place in the return air line; and a 7-ft. cyclone dust collector.

OBJECT—To determine capacities and grinds at various whizzer speeds relative fan power required.

PROCEDURE—Tests of ½ hour and 1 hour duration were made. Speeds of whizzer were predetermined by tachometer readings with fan running and mill not running. Power readings were taken during individual tests on a watt-hour meter. Three and four samples were taken during each run and resulting grinds on a screen analysis averaged. Screen tests were made dry through 100-mesh and wash tests were made through 200- and 325-mesh screens respectively. Screen tests were made of the feed. Whizzer speeds taken were horizontal shaft readings. The ratio of the speed of the horizontal shaft to the vertical whizzer shaft was 2 to 1.

GENERAL DATA—

Speed of mill, 210 r.p.m.
Speed of fan, 1260 r.p.m.
Mill motor, 75-hp., 690 r.p.m.
Fan motor, 50-hp., 1200 r.p.m.
Average range in hp. for mill overall 63.5 to 67.7.

Feed screen tests used throughout for

purposes of comparable capacities and grinds were as follows:

Feed fines:
Through 20-mesh, 100%
Through 30-mesh, 99.5%
Through 40-mesh, 83.0%
Through 50-mesh, 66.0%
Through 80-mesh, 41%
Through 100-mesh, 32%
Through 200-mesh, 17%
Through 325-mesh, 10%

To give the approximate difference in mill capacity when using relatively coarser feeds, Test No. 1, only, was conducted using the above feed as against a coarser feed screening as follows:

Feed coarse:
Through 6-mesh, 99.5%
Through 8-mesh, 98.5%
Through 20-mesh, 81.0%
Through 30-mesh, 44.0%
Through 40-mesh, 10.0%
Through 50-mesh, 5.0%
Through 80-mesh, 3.0%
Through 100-mesh, 2.0%

Conclusions

The successive increases in whizzer speeds result is a finer product as is evidenced by the various tests, with an attendant drop in mill capacity, which is to be expected.

The fan power requirements at various whizzer speeds are so nearly identical as to be considered negligible in making comparisons. A slight variation in theoretical loads on mill at these speeds might account for a slightly higher or lower power reading, as the case may be. It is of interest to note, however, that the power requirements of the fan, with the mill under load, are actually less when the whizzer is running than when it is stopped. Further, it is of interest that the power requirement of the fan is greater when the fan is run alone and the mill shut down. The reason apparently is that under this condition the fan is handling more air. Results under Test No. 1 show this.

TEST NO. 3

Whizzer speed, 250 r.p.m.	Through	50-mesh,	99.99%
Feed, fine	Through	80-mesh,	99.95%
Tons per hour, 6.8	Through	100-mesh,	99.5 %
Fan power load, 29.3 kw	Through	200-mesh,	95.4 %
	Through	325-mesh,	82.3 %

TEST NO. 4

Whizzer speed, 350 r.p.m.	Through	50-mesh,	100.0 %
Feed, fine	Through	80-mesh,	100.0 %
Tons per hour, 5.0	Through	100-mesh,	99.99%
Fan power load, 30.0 kw	Through	200-mesh,	99.2 %
	Through	325-mesh,	93.80%

TEST NO. 5

Whizzer speed, 500 r.p.m.	Through	50-mesh,	100.0 %
Feed, fine	Through	80-mesh,	100.0 %
Tons per hour, 4.13	Through	100-mesh,	100.0 %
Fan power load, 30.96 kw	Through	200-mesh,	99.7 %
	Through	325-mesh,	97.2 %

TEST No. 6

Whizzer speed, 600 r.p.m.	Through	50-mesh,	100.0 %
Feed, fine	Through	80-mesh,	100.0 %
Tons per hour, 3.23	Through	100-mesh,	100.0 %
Fan power load, 30.4 kw	Through	200-mesh,	99.95%
63.5 hp. on mill	Through	325-mesh,	99.10%

Standard Testing and Rating Procedure for Internal Combustion Engines

NO GREATER SERVICE could be rendered equipment manufacturers, engineers and government agencies, than the formulation and adoption of a standard method of rating and testing internal combustion engines for industrial applications.

A committee of engineers, appointed by the board of directors of the Internal Combustion Engine Institute, has been at work for a number of months studying this question.

The recommendations of this committee were submitted to the directors of the Institute early this summer, have since been approved and adopted, and issued in printed form.

In view of the importance attached to this subject, however, the newly adopted testing and rating methods are being presented below in complete form.

The following procedure shall be observed in testing and rating internal combustion engines produced and/or sold by a member of the Internal Combustion Engine Institute:

1. Engines

(a) All engine tests are to conform to the standard S. A. E. procedure with the following exceptions:

A bare engine is to be used with fixed carburetor setting. Allowance is to be made, however, for changing the spark at various speeds.

The fan and generator are to be omitted.

The speed of a given run is not to vary more than plus or minus 10 r.p.m.

The fuel used is to be 56 to 60 octane. However, if the engine is designed to use a better fuel, this may be done, but the fuel used must be recorded and appear in the test results.

(b) When the curves of the test are plotted, they are to show the performance of a laboratory standard engine with corrections being made to 29.92 in. of Mercury Barometer reading and a temperature of 60 deg. F.

(c) This curve is to be known as the standard net stripped engine curve.

(d) Production engines, after a run to reduce the friction to that of the laboratory standard, must develop 95% of the horsepower shown on the standard net stripped engine curve.

2. Power Units

The following procedure shall be observed in testing and rating power units produced and/or sold by a member of the Internal Combustion Engine Institute:

(a) This procedure covers power units as defined by the Internal Combustion Engine Institute in Section 3 hereof.

(b) The power unit is to be tested and the curves established as prescribed for bare engines, except that the power unit is to have the full equipment specified by the engine manufacturer for operation in actual service.

(c) The curve sheet is to give a list of all equipment and accessories that were installed for the test.

(d) It shall be noted on the sheet that the curves are corrected to 29.92 in. Mercury Barometer reading and temperature of 60 deg. F.

(e) These curves are to be designated as standard net power unit curves.

(f) Rating for Intermittent Maximum or Variable Load.

The engine manufacturer shall guarantee that the engine in actual service shall be capable of an output of at least 90% of that shown on the standard net power unit curve.

A deduction of 3% of the power shown on the standard net power unit curve shall be made for each 1,000 ft. rise in altitude above sea level.

A deduction of 1% of the power shown on the standard net power curve shall be made for each ten degrees rise in temperature above 60 deg. F.

(g) Rating for Continuous Load.

The engine manufacturer shall recommend that the continuous load on the engine shall not exceed 80% of that shown on the standard net power unit curve.

This 80% rating can be used for altitudes up to 3,000 ft. above sea level.

Above 3,000 ft., however, a deduction of 3% of the power shown on the standard net power unit curve is to be made for each additional 1,000 ft. above 3,000.

A deduction of 1% of the power shown on the standard net power unit curve, shall be made for each ten degrees rise in temperature above 60 deg. F.

3. Bulletins and Specification Sheets

Power curves appearing in bulletins, specification sheets or other forms of literature shall carry a statement to the effect that they are drawn up in accordance with the specifications and standards established by the Internal Combustion Engine Institute.

4. Example

The following example has been worked out in connection with a 100 hp. standard power unit for intermittent maximum or variable load, and continuous load in order to more clearly define the testing and rating procedure covered in Paragraph 2 hereof.

100-HORSEPOWER STANDARD POWER UNIT.

For Intermittent Maximum or Variable Load.

Altitude above sea level (feet).	Temperature, F.	Standard net power unit, hp.	Correction for intermittent maximum or variable load.	Correction for temperature	Correction for altitude	Total correction	Horsepower rating
0	80 deg.	100	—10	—2	0	—12	88
3000	80 deg.	100	—10	—2	—9	—21	79
6000	80 deg.	100	—10	—2	—18	—30	70

For Continuous Load.

Altitude above sea level (feet).	Temperature, F.	Standard net power unit, hp.	Correction for continuous load.	Correction for temperature.	Correction for altitude.	Total correction.	Horsepower rating.
0	80 deg.	100	—20	—2	0	—22	78
3000	80 deg.	100	—20	—2	0	—22	78
4000	80 deg.	100	—20	—2	—3	—25	75
6000	80 deg.	100	—20	—2	—9	—31	69

N. B.—The above example gives the results obtained without making any change in the manufacturer's standard compression ratio.

Rock Products News Briefs

Cement

Three Forks Portland Cement Co., Trident, Mont., has been awarded a $559,750 contract for cement for the Fort Peck dam.

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Universal Atlas Cement Co., Chicago, Ill., made the following announcement November 8: "The Duluth, Minn., plant, which has been closed for two months because of the curtailed demand for cement, will reopen about November 15. Resumption of operations is possible because stock has been reduced during the last 60 days and because a substantial order for cement has been received from the federal government for use on the Fort Peck dam near Wiota in eastern Montana. We are glad to be able to reopen the Duluth plant because of the employment it will provide at a time when employment is urgently needed."

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Canada Cement Co., Ltd., Montreal, Que., will probably operate its Port Colborne, Ont., plant all winter, according to I. M. McDonald, superintendent. It will be the first time in several years that the plant has been able to operate throughout the winter. Some 130 employes are affected. Recently the company said that the Toronto market will be supplied from the Port Colborne plant. It is this market which, it is understood, will enable the continued operation of the plant. Throughout the navigation season the *Cement Karrier*, the company's vessel, has been sailing regularly to Toronto with cement.

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Governor Horner of Illinois made a speech recently to a group of cement worker union members at La Salle, Ill., which is quoted in a local newspaper in part as follows: "I have been asked to speak about the cement situation. Before I was elected to the governorship the state was buying cement for 92c or 93c per bbl. The cement 'trust,' however, was getting bigger and stronger, and after I took over the office and called for the first bids, all of the companies submitted the same figure, $1.84 per bbl., an increase of almost 100%. I said at that time the price was not fair, but declared that I would not go outside the state to buy any cement for use within Illinois. Finally I had a bill passed that permitted the governor to buy cement without the formality of calling for bids, if he paid not more than 90% of the lowest bid. The state is willing to pay a reasonable price over the 93c figure if the difference between it and the price is placed in the pay envelopes of the working men. All I did on the cement question was to 'bust' the trust by giving the cement contracts to a man who lives in this community and who broke the price. The monopoly scared the liver out of this man and he went back to the monopoly. The cement is now being bought by the contractors. The companies now are dealing with the builders and the only thing the state is insisting upon is that the contractors buy Illinois cement for Illinois roads. That's the true situation in the cement question. It was a fight and we won. No one can bully Henry Horner on this or any other question where the welfare of the people of the state is concerned as long as he is governor."

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Statistics: The portland cement industry in October, 1934, produced 6,675,000 bbl., shipped 8,439,000 bbl. from the mills and had in stock at the end of the month 19,969,000 bbl. Production showed an increase of 32.5% and shipments an increase of 25.0%, as compared with October, 1933. Portland cement stocks at mills were 2.4% higher than a year ago. The mill value of the shipments—58,700,000 bbl.—in the first nine months of 1934 is estimated as $89,521,000. In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 162 plants at the close of October, 1934, and of 163 plants at the close of October, 1933.

RATIO (PER CENT) OF PRODUCTION TO CAPACITY

	October		Sept.,	Aug.,	July,
	1933	1934	1934	1934	1934
The month....	22.1	29.3	34.8	34.5	35.7
The 12 months ended	24.5	28.3	27.6	26.8	26.9

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Wages and Hours: A review of operations of the cement industry conducted by the Research Department of the A. F. of L., covering the first seven months of 1934, as compared with 1933, shows that employment has increased 25% over last year, total payrolls have increased nearly 50%, and average hourly rates have increased approximately one-third. The increase in employment is nearly the same as the increase in production. Average weekly wages have increased slightly more than cement prices. There has been a reduction in average hours worked per week of 5%, but the general figures for the industry show that hourly rates have been increased enough to more than offset this reduction in weekly hours. Reports from Cement Workers' Federal Unions Nos. 19435, 19310 and 19527 are considered, with the conclusion: "Everything that can be done by our unions this year toward establishing a sound relationship with employers will serve as a foundation on which to make further progress next year and also should help materially in safeguarding the interests of all union members during any seasonal curtailment of production." It is understood that further organization of workers in the cement industry is progressing and it is possible that an international charter may be issued to these workers by the A. F. of L. Executive Council, under authority of the 54th annual convention of the Federation recently concluded in San Francisco.

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Joint Conventions of the Aggregate Associations

THE following program has been announced for the concurrent annual conventions of the National Crushed Stone Association, the National Sand and Gravel Association and the National Slag Association, at the Palmer House, Chicago, Ill., January 27-February 1, 1935. An important feature will be a renewal of the machinery exposition sponsored jointly by the Manufacturers' Divisions of the National Sand and Gravel Association and the National Crushed Stone Association. A brief outline of the schedule of sessions is the following:

January 27.—Independent meetings of Boards of Directors of the three Associations.

January 28.—Meeting of Code Authority and opening of machinery exposition.

January 29.—Open meeting for all members of three industries for a discussion of Code problems; sponsored by the three Associations.

January 30.—Independent meetings of the three Associations.

January 31.—Independent meetings of Boards of Directors of three Associations, and, in the evening, a joint banquet for all members of the industries sponsored by the three Associations.

February 1.—Meeting of Code Authority or of Executive Committee or Executive Council of Code Authority.

For the purpose of working out details of program, speakers, etc., a small committee representative of the three Associations and of the Code Authority has been appointed, consisting of Messrs. Ahearn, Boyd, Goldbeck, Love and Walker—the secretaries and engineers of the three associations. Application has been made for reduced railroad fares and they will, without question, be granted. They will provide for ample latitude as to time of arrival and leaving to permit each member of the industry to make his plans to suit his convenience. It is believed, however, that the program will be of such outstanding interest that all members will want to arrange to be present at each of the sessions.

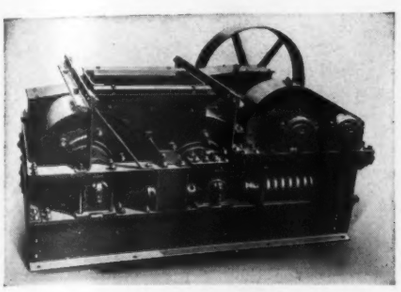
The Palmer House offers unusual attractions as a meeting place. It is especially well equipped to handle conventions and room charges are graduated to meet popular demands. The many restaurant facilities furnish an opportunity for eating economically and conveniently. Facilities for holding the machinery exposition are unusually good, special floor space having been designed and set aside for that purpose.

New Machinery and Equipment

New Roll Crusher

TO SUPPLEMENT its line of crushing equipment, Austin-Western Road Machinery Co. has just introduced the "Western" roll crusher, No. 3018. Among the features emphasized by the company are roller bearings with bearing rotation inside the roll; 2-in. manganese steel shells and provision for changing shells easily; roller chain drive; and a countershaft for direct motor drives.

This roll crusher is designed to produce

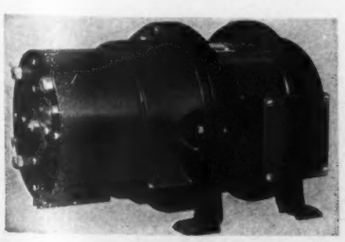


Roll crusher

material from 1½ in. down to dust. On short runs, sizes up to 4 in. can be produced if necessary. Maximum size of stone crushed in the roll should not be more than 1¼ in. plus the opening between the shells: For example, if shells are set ½ in. apart, there should not be larger than 1¾ in. stone fed.

Electric Brake

ESPECIALLY intended for controlling small hoists, cranes, winches and similar equipment, a new type of electric brake has been designed by General Electric Co. as an addition to its line of solenoid and thrustor-operated brakes. It is described as suitable for applications requiring no more than 50 pounds-feet braking torque on a



Electric brake of disk type

continuous basis, or 75 pounds-feet on an intermittent basis.

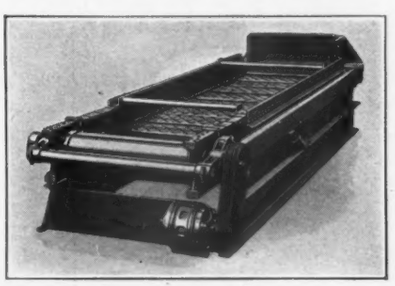
It is available for mounting with any type of motor. In construction, the new device is somewhat similar to an automobile clutch of the multiple-disk type. Braking pressure is applied whenever the power supply is interrupted, by a calibrated helical spring which forces the non-rotating disks against the rotating ones which are splined to the motor shaft.

Special Screen Features

THE SYMONS SCREEN shown in the accompanying illustrations, is of full floating design and lies flat. It is not necessary to incline it in order to obtain a movement of material along the deck; this is because of its action, a combination of conveying and screening. This action is such that the material is lifted and moved forward a definite distance with each movement of the eccentric. The screen has a heavy channel base to which is attached two sets of flexible inclined supports; one for the screen deck, the other for the side bars or balance deck which counterbalances the screen deck.

The screen is actuated from the drive unit located at the discharge end and this, too, is carried by means of four similar flexible supports, these being placed in a horizontal position. All moving parts thus are carried on flexible supports which prevent vibration being carried to building or screen supports.

With the screen set flat, says the Nordberg Manufacturing Co., in announcing this addition to its line, less headroom is needed; with no bouncing or cascading of materials along the deck, close grading is accomplished. The drive unit is equipped with anti-friction bearings and is enclosed against dust.



Quarter view, showing screen drive

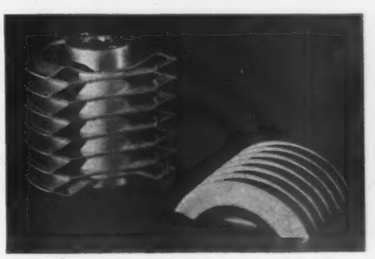
The screen cloth is set in removable panels; the cloth is not stretched.

Automatic Feed

A feed hopper is provided, this being located on the side bars and vibrates with the bars. This provides an automatic feed which spreads the material evenly over the entire deck area. The screens are built with single, double and triple decks and in lengths up to 20 feet.

Reinforced Sheaves

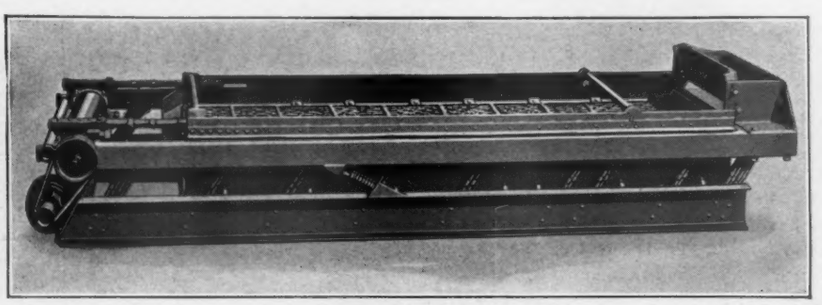
UNDER THE NAME of "DuroBrace Texsteel" Sheave, the Texrope Division of Allis-Chalmers Mfg. Co. has introduced a new reinforced steel sheave, the outside walls of which are reinforced by a convex steel plate. This feature, the company believes, strengthens the otherwise vulnerable areas to a degree that "practically eliminates" the possibility of distortion, regardless of the strains to which they are subjected. The outside walls of ordinary sheaves sometimes bend under the strain of excessive overloads, with the result that they are thrown off alignment.



Sheave with steel plate reinforcement

Welded

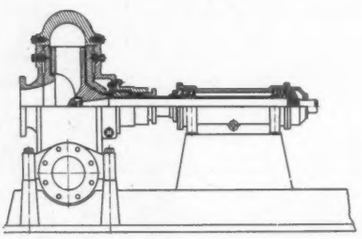
Welding at the rim and web, for additional strength, and the interior grid-type construction—design details formerly used—are retained in the new unit.



Flat screen unit

Heavy Duty Pump

BUILT IN 8- and 10-in. sizes, the "Lightning" sand and gravel pump has been provided with an adjustable floating bearing just back of the impellor, which



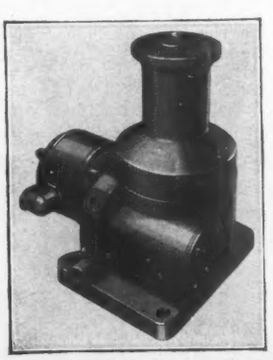
Sectional cut of pump showing liners, water-sealed chamber, inner bearings, protecting shaft sleeve, ball bearing position

helps take care of the load which, in the case of an ordinary pump, is projected on the bearing next to the shell, due to the overhang of the heavy impellor.

The main bearings on this unit are composed of two heavy double-row annular ball bearings encased in an oil-tight housing. Shell of the pump is heavy and machined to receive plates and liners and maintain them in their respective positions. The impellor is of the 4-vein enclosed type, barred to a taper fit on the shaft. It is not necessary to remove the shaft to take out or put on the impellor.

Motorized Car Spotter

THE VERTICAL-CAPSTAN electric car spotter designed by Link-Belt Co. is a compact unit with the motor attached directly to side of the spotter housing by bolts. The motor shaft extends into a substantial one-piece housing containing all the



Spotter with built-on motor

gears. Gears run in oil, and are quickly accessible. Motor is of the high-torque, fully-enclosed type and may be removed without disturbing the rest of the machine. This equipment is available in two sizes, the larger one having a rope pull of 10,000 lb., and the other a rope pull of 5000 lb.

Mobile Driller

FAVORABLE field reports are noted by Worthington Pump and Machinery Corp., in connection with its "Rock Master" lightweight drilling outfit. "A noteworthy case," says the company, "was on a job where the Rock Master did the work of five hand-held drills in a spot where a large wagon drill could not be applied." This drilling unit is said to be adaptable for down-hole drilling, line, hillside, breast-hole, side-hole and snake-hole drilling. The unit is furnished with feeds to accommodate a 3-ft., 4-ft., or a 6-

Portable drill in position on quarry operation

ft. steel change, and is recommended for holes up to 20 ft. in depth. It can be readily equipped with the manufacturer's pneumatic feed drifter—in either wet or dry type.

TVA Locomotives

FOUR 10-TON locomotives, each 12 ft. long, are being used by the Tennessee Valley Authority for hauling of nearly 1,000,000 cubic yards of concrete, which will be required for Norris Dam. Of the Plymouth-Westinghouse gas-electric type, they haul Insley concrete cars from the mixing plant, and operate the motors to tilt the four cu. yd. skips into the concrete buckets on the cable ways spanning the valley and covering the entire dam, spillway and power house area.

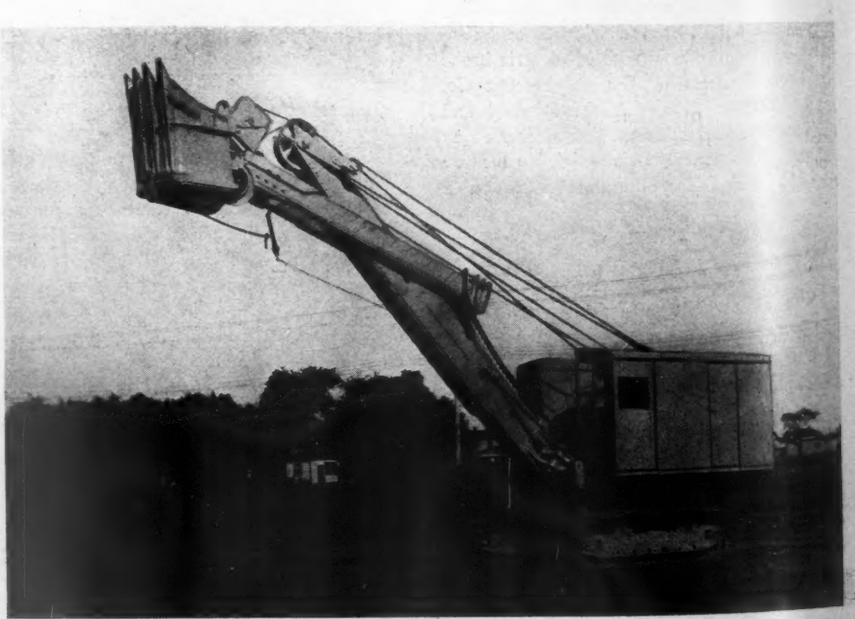
Gas-electric generators in the locomotive supply the power for all these operations to the buckets at the dam site.

New 1½-Yd. Unit

ADAPTABLE to shovel, crane, dragline back hoe and skimmer scoop work, the "Victor Special" 1½-yd. machine has been introduced by the Osgood Co., Marion, Ohio. It is described as convertible from one class of service to the other without necessity of any machinery changes whatsoever. All that is needed, says the company, is the change-over in front-end equipment, which can be done "within a space of two hours in the field." The unit is available with gasoline engine or Diesel engine or single-electric motor drive.

The upper revolving body and the lower body and roller path upon which the machine rotates as well as the side frames which carry the continuous tread are all of one-piece steel castings. As a shovel, the unit carries a steel boom of the inside type with outside type dipper handle and full manganese dipper.

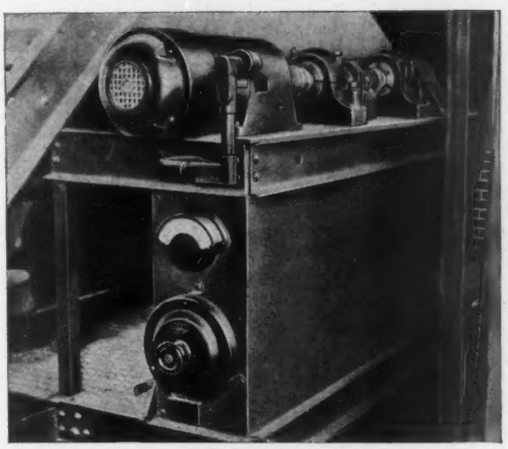
As a crane or dragline or clamshell unit. it is furnished with boom of required length to suit the operator's needs.



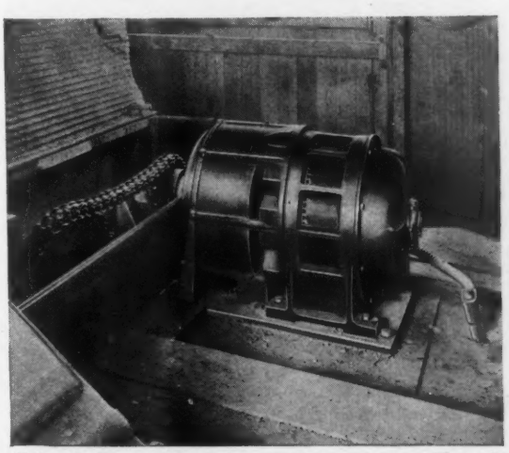
1½-yd. convertible unit

TO CUT INSTALLATION COST SAVE SPACE REDUCE MAINTENANCE

....use G-E GEAR-MOTORS



Here's a totally enclosed, fan-cooled, adjustable-speed gear-motor direct-connected to a screw conveyor feeding a kiln in a mid-western plant

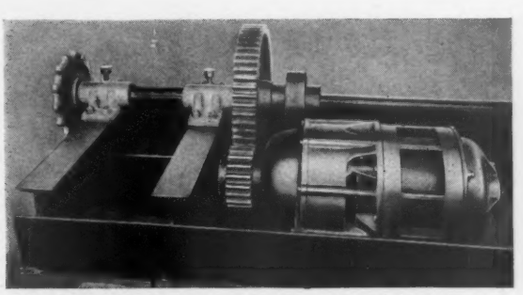


This 133-rpm. gear-motor drives a 2-ton pug-type cold-amesite mixer in a New York rock-products plant

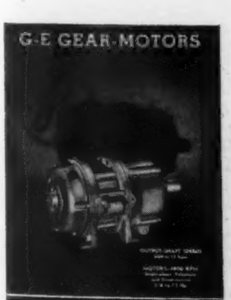
Compact, efficient drives for your low-speed machines

G-E gear-motors will deliver full rated power from the output shaft at the low speed you want. You can connect them directly to your machines, or use simple chain, belt, or gear drives. Thus, you eliminate complicated back gearing or countershafts, save space, reduce installation cost, and cut maintenance.

Gear-motors combine the economies of normal-speed motors with those of accurately cut helical gears running in oil. They are available, in standard a-c. and d-c. voltages, from 1/6 to 75 hp. You'll find them smooth-running, dependable, long-lived—the kind of a drive that will help you save money.



This G-E gear-motor is gear connected to an asphalt-mixing plant in Cleveland, Ohio



This booklet is full of useful information on G-E gear-motors . . . types and sizes available . . . where to use them . . . installation photographs. Send coupon for your copy

GENERAL ELECTRIC

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Dept. 6D-201, Schenectady, N. Y.

Please send me a copy of your handy booklet, G-E GEAR-MOTORS, GEA-1437B.

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Company.....

Address.....020-38

THE INDUSTRY

New Incorporations

Consolidated Gravel Co., Buffalo, N. Y. Herbert M. Bilsky, 1560 Elmwood Ave., owner.

Bradley Hills Quarries, Inc., Bethesda, Md. Incorporators are Charles H. Merryman and James L. Richards.

Cumberland Sand and Gravel Co., Inc., Portland, Maine; $10,000. President, Larry Leone; treasurer, Domenick De Roll.

Ohio Rock Asphalt Co., Worthington, Ohio; 200 shares no par. Incorporators are Otto Meyer, George S. Meyer and Forrest R. Detrick.

Industrial Sand and Material Co., 512 Dime Bank Bldg., Detroit, Mich.; to deal in material; $25,000; Ben Colman, 10410 E. Jefferson Ave.

Century Cement Manufacturing Co., Inc., Cleveland, Ohio; cement blocks; 200 shares, no par value. Filed by Mooney, Hahn, Loesser and Keough, Cleveland, Ohio.

Cherokee Sand and Gravel Co., Inc., Knoxville, Tenn.; $25,000. Incorporators are H. N. Carmichael, C. L. Carmichael and W. C. Kinzel, 306 N. Olive St., Knoxville, Tenn.

Strathmann Sand and Gravel Corp., Camden, N. J.; sand and gravel; $100,000 preferred and 250 shares common no par. Agent, New Jersey Corp. Guaranty & Trust Co.

Campbell Limestone Co., Knoxville, Tenn., with offices at the Campbell and Deane Co., Thirteenth District. Incorporators are R. S. Campbell, Charles D. Snepp and Charles M. Seymour.

Acme Sand and Gravel Co., Inc., Woburn, Mass.; $25,000; 250 shares, $100 each. President, James Ruggiero; treasurer, Harry A. Friberg, 99 High st., Winchester, Mass.; and Anthony J. Ruggiero.

G. L. Baldwin, Inc., Providence, R. I.; sand, gravel and general construction; 500 shares common, no par value. Incorporators are Edward M. Brennan, Andrew P. Quinn and George A. Jacobson.

Calcium Carbonate Co., 43 W. Ohio st., Chicago, Ill.; to deal in limestone and limestone products; 250 shares p.v. common. Incorporators are T. P. Black, B. D. Reynolds and L. E. Koken. Correspondent: Lancaster and Nichols, Blackstone Bldg., Sixth and Vermant, Quincy, Ill.

Orange County Crushed Stone Corp., Manhattan, N. Y.; crushed stone; 350 shares $100, 500 shares no par value. Incorporators are Andres E. Lucas, 155 S. William St., Newburgh, N. Y.; Stirling Tomkins, 230 Park Ave., New York, N. Y.; and Richard W. Jones, Jr., 230 Park Ave., New York, N. Y.

Obituaries

Platt B. Walker, Jr., 39, of St. Paul, Minn., died suddenly of a heart attack October 23. He was district manager of the Hawkeye Cement Co.

Otto L. Sturzinger, Genoa, Ohio, was found dead in his home October 26. He was assistant superintendent of the Kelley Island Lime and Transport Co.

Forrest H. Guild, treasurer and manager of Vermont Mineral Products, Inc., Chester, Vt., died November 8 at the age of 58. He organized Vermont Mineral Products, Inc., about six years ago.

Ralph M. Dravo, president of Dravo Contracting Co. and chairman of the board of Dravo Corp., Pittsburgh, Penn., died at his Sewickley Heights, Penn., home on November 11, aged 66 years.

William Penn, 73, president of the William Penn Stone Co. of Sandstone, Minn., died at his home in Minneapolis, Minn., October 16. The William Penn Stone Co. is affiliated with the Sandstone Quarries Co.

William H. Caffery, 79, founder of the former Bonner Portland Cement Co., Bonner Springs, Kan., and Kansas City Portland Cement Co., died November 4 in Kansas City, Mo. He moved to Kansas City in 1886 and organized the two companies shortly after the turn of the century. Mr. Caffery also served as an official of the former Western Crushed Rock Co. and Kansas City Sand Co.

Henry F. G. Wulf, 63, president and general manager of the Monarch Cement Co., Humboldt, Kan., died of a heart attack October 19 at his desk in the company office. As receiver of the old Monarch Cement Co., Mr. Wulf came to Humboldt from Garden Plain, Kan., in 1912. The following year he was named president of the reorganized Monarch Cement Co. Mr. Wulf was also president of a state bank at Garden Plain, and was vice-president of the Humboldt National Bank.

Personals

M. M. Smith has recently taken over the managership of Compañia de Cemento Nacional, at Guayaquil, Ecuador.

L. E. Williams, secretary-treasurer of Michigan Sand Gravel Products Assn., is a sponsor of the plan to organize a state-wide Chamber of Commerce for Michigan.

C. Y. Cunningham, of Volunteer Portland Cement Co., Knoxville, Tenn., recently served as an FHA canvasser in a 5-day campaign to learn the city's home repair needs and to explain the FHA loan plan to property owners.

John Buniak and Joseph Brosky, of Universal Atlas Cement Co., Hudson, N. Y., were admitted to the company's 25 Year Club October 24, when Richard A. Dittmar, general manager of the Hudson plant, presented them with service medals.

Stanford T. Crapo, vice president and treasurer of the Huron Portland Cement Co., Detroit, Mich., was reëlected November 16 as a class B director of the Federal Reserve Bank of Chicago. Mr. Crapo was elected by member banks in group one of the seventh federal reserve district.

John A. Blank, consulting chemist of Cementos Aroyac, S. A., and the Cement Process Corp., of Delaware, is making a tour of cement plants in the Allentown district where he started his cement career some 30 years ago. He will return to his home at Ironton, Ohio, for the holiday season.

Cement

Consolidated Cement Corp. plant at Fredonia, Kan., began operations November 2.

Superior Portland Cement Co. plant, Concrete, Wash., began operations October 29 for a six-weeks' run.

Lone Star Cement Co. plant at Bonner Springs, Kan., resumed operation November 1, recalling about 150 men.

Lehigh Portland Cement Co. plant at Sandt's Eddy, Penn., was scheduled for reopening in November.

Huron Portland Cement Co. packhouse at the Oswego, N. Y., plant has been equipped with a complete "Norblo" dust collecting system.

Senior students in business and commerce at the University of Alabama recently made a tour of the Morton plant of the **Alpha Portland Cement Co.**, where they studied processing methods.

Alpha Portland Cement Co. cement mill at La Salle, Ill., was working full force again November 1. The kilns had been closed down August 1 and since that time only the clinker-grinding department had been operated.

The Duluth, Minn., plant of **Universal Atlas Cement Co.** was reopened November 15 after a two-months' shut-down. Resumption of operation was possible because stocks had been reduced and because a substantial order for cement had been received from the federal government for use on the Fort Peck dam in eastern Montana.

Canada Cement Co., Ltd., announces the transfer of J. M. Breen from the Toronto office to Montreal to assume the position of chief of the technical staff. Mr. Breen is a graduate engineer of the University of Toronto. He has worked for the roads department of the city of Toronto, and entered the employ of Canada Cement Co., Ltd., in 1922.

Crushed Stone

Henry Roscum's rock quarry, southwest of Burlington, Ia., has been leased by the city council.

Tennessee State limestone crusher is being kept busy, having been operated at Pleasant Grove, Unionville, and Deason by farmers at those points.

Wm. Helmuth quarry, north of Garden City, Mo., is supplying rock for a new road. About 60 men are working 4 days a week on this PWA project.

The Rocky Hollow quarry near Anniston, Ala., is keeping 25 men busy in supplying material for public building projects under the Alabama Relief Administration.

Stone to improve city streets is being taken from the quarry on the George Todd farm near Wheeling, W. Va., where FERA has given employment to a number of men.

The Missouri State Highway Department started crushing rock at the **Johnson Rock Quarry**, Pleasant Hill, Mo., recently for use in constructing Highway 58 west to Highway 35.

Quarrying operations in Henry county, Iowa, were transferred recently from the quarry east of Salem to that southwest of Mt. Pleasant. About 80 men working under FERA are employed in this project.

The rock quarry on the Embree farm east of Atlanta, Mo., was opened October 29 to furnish material for the state highway project to Moody School. Fifty miles of farm to market road will also be surfaced from a federal project.

The quarry in German township at Grundy Center, Ia., was opened in October to make work for 25 men on county relief. Later, more men will be given work in the quarry. The material taken out will be used on county roads next year.

Two limestone quarries in the Root river erosion control demonstration areas of the U. S. Soil Erosion Service were opened recently near Spring Valley, Wis. At least three more quarries will be opened in this area, according to government plans.

New finds of rock on **Anderson quarry** property near Fairfield, Ia., caused a postponement of plans to move the Jefferson county stone crushing machinery to a new quarry in the same Germanville neighborhood. When the Anderson quarry is exhausted, rock from the Godwin farm will be taken for the Salina road graveling.

Sand and Gravel

Clark County (Wis.) highway committee recently purchased two gravel pits for county use.

Missouri Gravel Co. has a project under contract at Pleasant Hill, Mo., and is moving its gravel digging and cleaning machinery there upon completion of its work in surfacing Adams county roads near Louisiana, Mo.

New bunkers with a daily capacity of 400 cu. yd. have been installed at the **County gravel pit** west of Clarkston, Idaho, by William Fruen, district road supervisor. The deposit is estimated to have 4,000,000 cu. yd. of gravel.

W. B. Hall of Stratton, Neb., has leased land of James Thomas for a gravel pit. He has a contract for furnishing gravel to the Burlington Railroad at Trenton for bedding all stock cars, and also has contracts for several road projects.

Colorado state gravel plant operators brought equipment to Craig, Colo., late in October and began operations at the Victory Heights gravel pit. Crushed material is being stockpiled for repair use on the Victory highway next spring.

Manufacturers

Ohio Power Shovel Co. announces enlargement of its line to include a 2-yd. shovel, Model 801.

Tyson Roller Bearing Corp., Massillon, Ohio, announces election of Russell E. Colgate as president and treasurer, succeeding Charles E. Stuart, who resigned November 1. Mr. Stuart remains on the board of directors.

Bonnot Co., Canton, Ohio, announces the appointment of Brown and Sites Co., Inc., 30 Church St., New York, N. Y., as eastern representative covering the eastern half of New York state, New Jersey, and Connecticut.

Trade Literature

General. Bulletin No. 5000 is a new general catalog, available upon application, describing complete line of crushers, scrubbers, conveyors, dryers, etc. TRAYLOR ENGINEERING AND MFG. CO., Allentown, Penn.

Screens. A "pencil test" to show that vibration is confined to the live screen and not transmitted to the supporting frame is described in a one-page circular featuring the power and balance of Tyler-Niagara screens. W. S. TYLER CO., Cleveland, Ohio.

"I ~~HOPE~~ KNOW I PURCHASED THE RIGHT WIRE ROPE"

A SILVER STRAND ELIMINATES DOUBT

IN THE selection of Wire Rope—the difference between "know" and "hope" is frequently the difference between economy and needless cost. There is never a doubt, as far as Wire Rope quality is concerned—or economy either—when a Silver Strand governs choice. Monitor Silver Strand Wire Rope is made exclusively by the American Steel & Wire Company—the largest manufacturers of Wire Rope in the world—and service records prove it superior in wear, strength and endurance. Perfectly constructed of the highest quality steel—and with abrasion resisting factors—it is waiting to serve you—to substitute "know" for "hope" in your next Wire Rope order.

AMERICAN STEEL & WIRE COMPANY

MONITOR

SILVER STRAND WIRE ROPE

1831

1934

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Classified Directory of Advertisers in this Issue of Rock Products

For alphabetical index, see page 2

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American Steel & Wire Co.

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F. L. Smidth & Co.

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Fuller Co.

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Babbitt Metal
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Ohio Power Shovel Co.

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Harnischfeger Corp.
Ohio Power Shovel Co.

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Chase Bag Co.

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SKF Industries, Inc.

Balls (Tube Mill, etc.)
Allis-Chalmers Mfg. Co.
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Koehring Company, Division of National Equipt. Corp.

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Link-Belt Co.
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Timken Roller Bearing Co.
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Bearings (Anti-Friction)
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Bearings (Roller)
SKF Industries, Inc.
Timken Roller Bearing Co.

Bearings (Tapered Roller)
Timken Roller Bearing Co.

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SKF Industries, Inc.
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Belt Lacing
Flexible Steel Lacing Co.

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United States Rubber Co.

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Blaw-Knox Co.
Traylor Eng. & Mfg. Co.

Bin Gates
Fuller Co.
Link-Belt Co.
Robins Conveying Belt Co.
Traylor Eng. & Mfg. Co.

Bit Sharpeners and Tools
Bucyrus-Erie Co.

Blast Hole Drills
Bucyrus-Erie Co.

Blasting Powder (See Powder, Blasting)

Blasting Supplies
Hercules Powder Co.

Blocks (Pillow, Roller Bearing)
Link-Belt Co.
SKF Industries, Inc.
Timken Roller Bearing Co.

Blocks (Sheave)
American Manganese Steel Co.

Boots and Shoes
United States Rubber Co.

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Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

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Mine Safety Appliances Co.

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Blaw-Knox Co.
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Wellman Engineering Co.

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Link-Belt Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

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Caps (Blasting)
Hercules Powder Co.

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Link-Belt Co.
Robins Conveying Belt Co.

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Eagle Iron Works (Grey Iron)
Link-Belt Co.
Timken Roller Bearing Co.

Cement Making Machinery
F. L. Smidth & Co.

Cement Process
Cement Process Corp.

Cement Pumps
Fuller Co.
F. L. Smidth & Co.

Cement Waterproofing
Wyodak Chemical Co.

Central Mixing Plants (Concrete)
Blaw-Knox Co.

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Bucyrus-Erie Co.

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American Manganese Steel Co.
Chain Belt Co.
Link-Belt Co.

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Chain Belt Co.

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American Manganese Steel Co.
Cross Engineering Co.

Chutes for Minimizing Segregation
Robins Conveying Belt Co.

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Bucyrus-Erie Co.

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Bonnot Company.

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American Steel & Wire Co.
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Williams Patent Crusher & Pulv. Co.

Coal Pulverizing Equipment
Bonnot Company.
Pennsylvania Crusher Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Compressed Air Rock Drills
Gardner-Denver Co.

Compressed Air Hoists
Gardner-Denver Co.

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Fuller Company
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Lewistown Fdy. & Mach. Co.
Link-Belt Co.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Conveyors (Pneumatic)
Fuller Company

Conveyors (Screw)
Link-Belt Co.

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F. L. Smidth & Co.

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Ohio Power Shovel Co.

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Cranes (Overhead Traveling Electric)
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United States Rubber Co.

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American Manganese Steel Co.
Bucyrus-Erie Co.
The Frog, Switch & Mfg. Co
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American Manganese Steel Co.

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Koehring Co. (Dumptor)

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Marion Steam Shovel Co.

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Marion Steam Shovel Co.
Ohio Power Shovel Co.

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Hayward Co.
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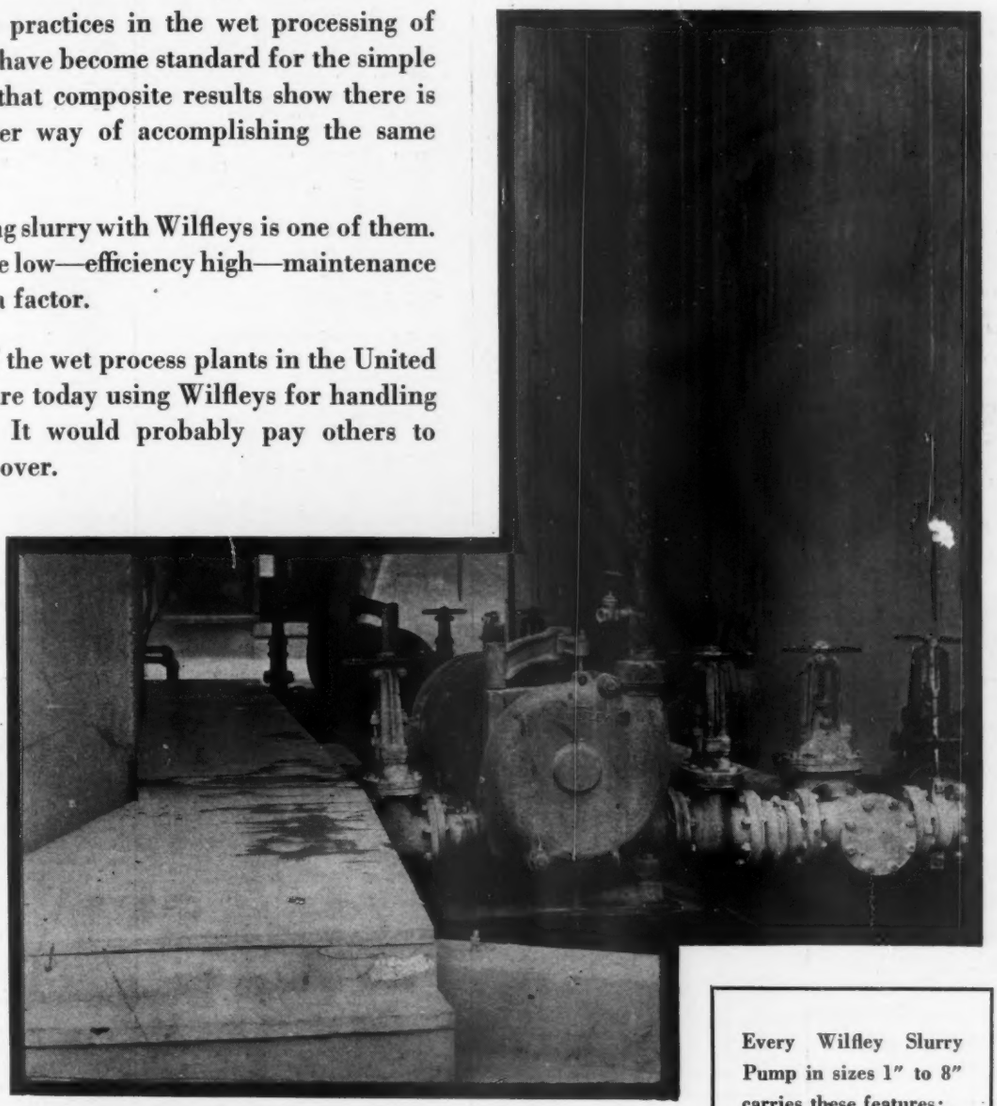
Certain practices in the wet processing of cement have become standard for the simple reason that composite results show there is no better way of accomplishing the same thing.

Pumping slurry with Wilfleys is one of them. Costs are low—efficiency high—maintenance hardly a factor.

Most of the wet process plants in the United States are today using Wilfleys for handling slurry. It would probably pay others to change over.



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Reg. U. S. Pat. Off.

Every Wilfley Slurry Pump in sizes 1" to 8" carries these features:

no stuffing box
extra heavy parts
simple clearance take-up
10 minute change of pumping parts
protection to inner parts

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Wm. Hamilton Division, Montreal, Quebec, Canada

SOUTH AFRICA
Edw. L. Bateman (Pty.) Ltd.
Locarno House, Johannesburg

AUSTRALIA
The Mine and Smelter Supply Co.
c/o F. H. Jackson, 67 York St., Sydney

THE NETHERLANDS
Dorr-Oliver N.V.
Wassenaarsche Weg 40, The Hague

ENGLAND
Dorr-Oliver Co., Limited
Abford House, Wilton Road, London, S.W.1

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 2

Drills (Rock)
Gardner-Denver Co.

Drives (Short Center)
Allis-Chalmers Mfg. Co.

Dryers
Allis-Chalmers Mfg. Co.
Bonnot Company.
Traylor Eng. & Mfg. Co.
W. S. Tyler Co.
United States Machy. Co., Inc. (Gypsum Wall Board)

Dumptors
Koehring Company, Division of National Equipt. Corp.

Dust Collecting Systems
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.

Dust Conveying Systems
Fuller Co.

Dust Hoods and Helmets
Mine Safety Appliances Co.
Pulmosan Safety Equipt. Corp.

Dynamite
Hercules Powder Co.

Electric Cables and Wires
American Steel Wire Co.
John A. Roebling's Sons Co.

Electric Mine Hoists
Nordberg Mfg. Co.

Electric Power Equipment
Allis-Chalmers Mfg. Co.
General Electric Co.

Engineers
Bonnot Company.
Productive Equipment Corp.
Robins Conveying Belt Co.
F. L. Smidth & Co.
United States Machy. Co., Inc.

Engines (Diesel)
Nordberg Mfg. Co.

Engines (Steam)
Morris Machine Works

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Koehring Company, Division National Equipt. Corp.

Excavators (Dragline)
Koehring Company, Division of National Equipt. Corp.

Explosives
Hercules Powder Co.

Fans (Electric)
General Electric Co.

Feeders
Fuller Co. (Cement and Pulverized Material)
Robins Conveying Belt Co.
Smith Engineering Works (Plate)

First Aid Equipment
Mine Safety Appliances Co.

Flights
Cross Engineering Co.

Forges (Oil)
Gardner-Denver Co.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Fuses (Electrical)
General Electric Co.

Gaskets
United States Rubber Co.

Gears and Pinions
General Electric Co.
Link-Belt Co.

Gelatine and Semi-Gelatine
(See Explosives)

Goggles (Safety)
Mine Safety Appliances Co.
Pulmosan Safety Equipt. Corp.

Grapples (Stone)
Blaw-Knox Co.
Hayward Co.

Grease
Gulf Refining Co.

Grizzlies
American Manganese Steel Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Grizzly Feeders
Traylor Eng. & Mfg. Co.

Hammer Drills
Gardner-Denver Co.

Hammer Mills (See Crushers)

Hoists
Curtis Pneumatic Machy. Co.
Gardner-Denver Co.
Harnischfeger Corp.
Link-Belt Co.

Hose (Water, Steam, Air, Drill, Pneumatic)
United States Rubber Co.

Hydrators
Blaw-Knox Co.

Hydraulic Cement Admixture
Wyodak Chemical Co.

I-Beam Trolleys
Curtis Pneumatic Machy. Co.

Inhalators
Mine Safety Appliances Co.

Insulation (Electric)
General Electric Co.

Kilns and Coolers (Rotary)
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
Bonnot Company.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.

Kominuters (See Mills)

Lamp Guards
Flexible Steel Lacing Co.

Lamps (Electric Cap)
Mine Safety Appliances Co.

Lighters (Hot Wire for Safety Fuse)
Ensign-Bickford Co.

Lime Handling Equipment
Fuller Co.
Link-Belt Co.

Linings (Iron for Ball and Tube Mills) (See Mill Liners)

Linings (Rubber for Ball and Tube Mills)
United States Rubber Co.

Loaders and Unloaders
Bucyrus-Erie Co.
Link-Belt Co.
Marion Steam Shovel Co.
Robins Conveying Belt Co.

Locomotive Cranes (See Cranes, Crawler and Locomotive)

Locomotives (Steam, Gas and Electric)
General Electric Co.

Locomotives (Storage Battery)
General Electric Co.

Log Washer
McLanahan & Stone Corp.
Smith Engineering Works

Lubricants
Gulf Refining Co.

Lubricants (Wire Rope)
American Steel & Wire Co.

Machinery Guards
Harrington & King Perforating Co.
W. S. Tyler Co.

Magnets
General Electric Co.

Manganese Steel Castings
American Manganese Steel Co.
The Frog, Switch & Mfg. Co.

Manganese Steel Parts
American Manganese Steel Co.

Mechanical Rubber Goods
United States Rubber Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)
Allis-Chalmers Mfg. Co.
Bonnot Company.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Mill Liners and Linings (Iron for Ball and Tube Mills)
F. L. Smidth & Co.

Mixers (Concrete)
Koehring Company, Division of National Equipt. Corp.

Motor Trucks
General Motors Truck Co.

Motors and Generators (Electric Units)
Allis-Chalmers Mfg. Co.
General Electric Co.
Harnischfeger Corp.

Nozzles (Gravel Washing)
Binks Mfg. Co.

Oils (Lubricating)
Gulf Refining Co.

Overhead Traveling Cranes
Curtis Pneumatic Machy. Co.

Packing
United States Rubber Co.

Packings (Pump, Valve, Etc.)
United States Rubber Co.

Pavers (Concrete)
Koehring Company, Division of National Equipt. Corp.

Perforated Metal
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.
Morrow Mfg. Co.

Plaster Board Dryers
United States Machy. Co., Inc.

Plate (Double Corrugated)
Hendrick Mfg. Co.

Plates
Cross Engineering Co.

Portable Conveyors
Fuller Company
Link-Belt Co.
Robins Conveying Belt Co.

Portable Crushing and Screening Unit
Good Roads Machy. Corp.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Powder (Blasting)
Hercules Powder Co.

Power Transmission Machinery
SKF Industries, Inc.

Pulverators
Allis-Chalmers Mfg. Co.

Pulverizer Parts
American Manganese Steel Co.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.
Bonnot Company.
Dixie Machy. Mfg. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Pumps (Air Lift)
Fuller Co.

Pumps (Cement)
Fuller Co.

Pumps (Cement Slurry)
American Manganese Steel Co.
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
Allis-Chalmers Mfg. Co.
Morris Machine Works
A. R. Wilfley & Sons

Pumps (Dredging)
American Manganese Steel Co.
Bucyrus-Erie Co.
Morris Machine Works

Pumps (Sand and Gravel)
Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Morris Machine Works
A. R. Wilfley & Sons

Railway Equipment
General Electric Co.

Railways (Electric)
General Electric Co.

Ready-Mixed Concrete (Truck Mixer Bodies)
Blaw-Knox Co.

Ready-Mixed Concrete Plants
Blaw-Knox Co.

Respirators
Mine Safety Appliances Co.
Pulmosan Safety Equipt. Corp.

Road Machinery
Blaw-Knox Co.
Harnischfeger Corp.
Koehring Company, Division of National Equipt. Corp.
Marion Steam Shovel Co.

Rock Bits (See Drill Bits)

Rock Drills (See Drills, Rock)

Rod Mills
Traylor Eng. & Mfg. Co.

Roller Bearings
SKF Industries, Inc.
Timken Roller Bearing Co.

Roller Dryers
United States Machy. Co., Inc.

Roofing and Siding (Steel)
Joseph T. Ryerson & Son, Inc.

Rope, Wire (See Wire Rope)

Safety Equipment
Mine Safety Appliances Co.
Pulmosan Safety Equipt. Corp.

Sand Drag
Smith Engineering Works

Sand Settling Tanks
Link-Belt Co.
Smith Engineering Works

Scrapers (Power Drag)
Blaw-Knox Co.
Harnischfeger Corp.
Link-Belt Co.

Screens
Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Audubon Wire Cloth Corp.
Bartlett, C. O., & Snow Co.
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Link-Belt Co.
Morrow Mfg. Co.
National Wire Cloth Co.
Nordberg Mfg. Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
John A. Roebling's Sons Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
W. S. Tyler Co.
Universal Vibrating Screen Co.

Screens, Scalping (Hercules and Standard)
Smith Engineering Works

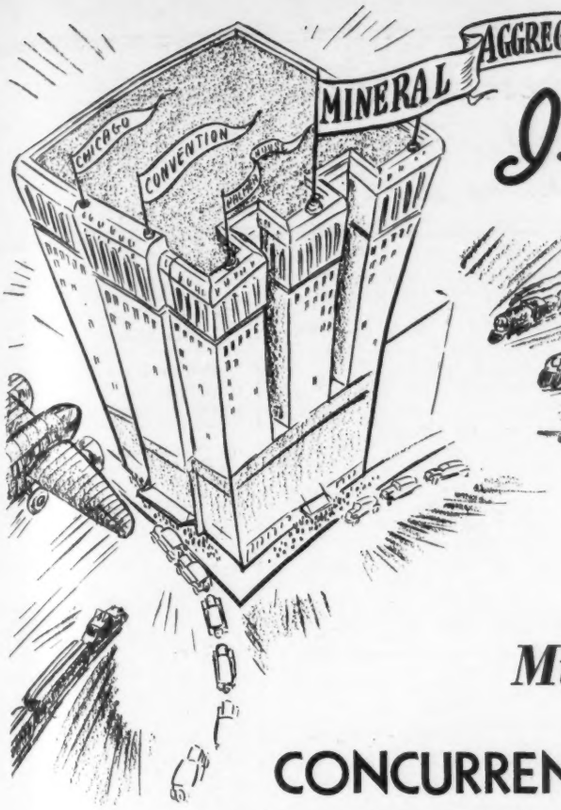
Screens (Vibrating)
Jeffrey Mfg. Co.
Link-Belt Co.
Nordberg Mfg. Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
W. S. Tyler Co.
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

Screens, Washing (Hercules, Ajax and Standard)
Smith Engineering Works

Screw Rewasher (Single and Twin)
Smith Engineering Works

Scrubbers
Lewistown Fdy. & Mach. Co.

Scrubbers (Gyrating Tube)
W. S. Tyler Co.



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and FEBRUARY 1, 1935

Biggest Event in the History of the Mineral Aggregate Industries

CONCURRENT ANNUAL CONVENTIONS

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National Sand and Gravel Association
National Slag Association

Second Annual Meeting of the National Code Authority

of the Crushed Stone, Sand and Gravel, and Slag Industries

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of the combined Manufacturers' Divisions
of the National Crushed Stone Association
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for room reservations.

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Munsey Building, Washington, D. C. — Munsey Building, Washington, D. C.

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

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Seal Rings
Traylor Eng. & Mfg. Co.

Separators (Slurry)
F. L. Smidth & Co.

Shovels, Power (Steam, Gas, Electric, Diesel, Oil)
Bucyrus-Erie Company
Harnischfeger Corp.
Koehring Company, Division of National Equipt. Corp.
Link-Belt Co.
Marion Steam Shovel Co.
Ohio Power Shovel Co.

Silos
F. L. Smidth & Co.

Skip Hoists and Skips
Link-Belt Co.
Robins Conveying Belt Co.

Slings (Wire Rope)
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Sockets (Wire Rope)
American Steel & Wire Co.

Speed Reducers
Link-Belt Co.
Traylor Eng. & Mfg. Co.

Spray Nozzles
Binks Mfg. Co.

Sprockets and Chain
American Manganese Steel Co.

Steam Shovel Repair Parts
American Manganese Steel Co.

Steel Bars
Timken Roller Bearing Co.

Steel (Bars, Shapes, Plates, etc.)
Joseph T. Ryerson & Son, Inc.

Steel (Electric Furnace)
Timken Roller Bearing Co.

Steel (Open Hearth)
Timken Roller Bearing Co.

Steel (Special Alloy)
Timken Roller Bearing Co.

Steel (Special Analysis)
Timken Roller Bearing Co.

Tanks
Link-Belt Co.

Tires and Tubes
United States Rubber Co.

Testing Sieves and Shakers
W. S. Tyler Co.

Track Equipment
Nordberg Mfg. Co.

Track Shifters
Nordberg Mfg. Co.

Tractors
Koehring Company, Division of National Equipt. Corp.

Tramways (Aerial Wire Rope)
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Transmission Belting
(See Belting)

Transmission Machinery
Allis-Chalmers Mfg. Co.
Timken Roller Bearing Co.

Trippers
Robins Conveying Belt Co.

Troughs
Cross Engineering Co.

Truck Bodies (Ready Mixed Concrete)
Blaw-Knox Co.

Trucks and Trailers (See Motor Trucks)

Trucks (Mixing)
Blaw-Knox Co.

Trukmixers
Blaw-Knox Co.

Tube Mills (See Mills, Ball, Tube, etc.)

Tube Mill Liners (See Mill Liners)

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Tubing (Seamless Steel)
Timken Roller Bearing Co.

Underground Shovels
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Valves (Pump)
United States Rubber Co.

Vibrating Screens (See Screens, Vibrating)

Vibrators
W. S. Tyler Co.

Wall Board Dryers
United States Machy. Co., Inc.

Washers (Sand, Gravel and Stone)
Allis-Chalmers Mfg. Co.
Eagle Iron Works
Link-Belt Co.
Traylor Eng. & Mfg. Co.
W. S. Tyler Co.

Weigh-Mix
Koehring Company, Division of National Equipt. Corp.

Welding and Cutting Apparatus
General Electric Co.
Harnischfeger Corp.

Welding Rod
American Steel & Wire Co.
Joseph T. Ryerson & Son, Inc.

Welding Wire
American Steel & Wire Co.
John A. Roebling's Sons Co.

Well Drills
Bucyrus-Erie Co.

Wheels (Car)
American Manganese Steel Co.

Wire (Rubber Insulated)
American Steel & Wire Co.
United States Rubber Co.

Wire Cloth
Audubon Wire Cloth Corp.
National Wire Cloth Co.
John A. Roebling's Sons Co.
W. S. Tyler Co.

Wire Rope
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Fittings
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Slings (See Slings, Wire Rope)

Wire Rope Sockets (See Sockets, Wire Rope)

NEVERBURST

IMPROVED

MULTI-WALL

THE BETTER BAG FOR YOU

Contractors, engineers, builders, architects and others see your trade mark and advertising message because all sides of these bags can be printed.

Safe to Use

CHASE BAGS

Your product is protected against moisture and loss through bag breakage. These Chase bags are plenty tough. They stack better —take up less room—are easier to fill and are filled more quickly. Neat appearance plus sturdiness make them the one bag with which to build good will and business. There are many reasons why these bags are preferred by many prominent users. Write for details.

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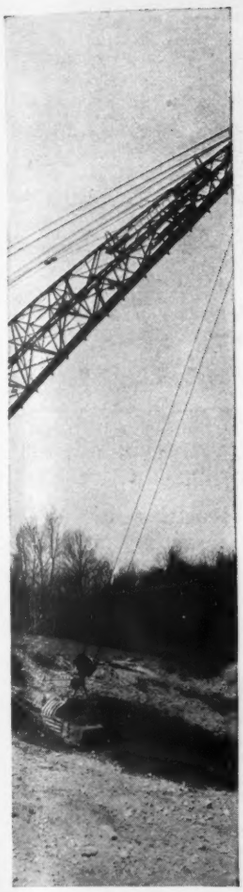
Dallas Goshen, Ind. St. Louis
Toledo Milwaukee Kansas City
Chagrin Falls, O. New Orleans

CHASE BAG CO.
TOLEDO, OHIO

SALES OFFICES
Chicago Los Angeles Denver
Detroit San Francisco Cleveland
New York Orlando, Fla. Memphis
Hutchinson, Kan. Charleston, S. C.



DOUBLE DUTY AT THE PIT

● The Bucyrus-Monighan Walking Dragline performs a two-fold service at the gravel pit: It strips the pit and then loads gravel on the cars or into the hopper. It works on top and stands high and dry when loading as well as when stripping.

No matter how crooked the path may be, the Walker can closely parallel it, because of the machine's exclusive walking traction. And it can instantly face about or step directly away from a bank-slide or cave-in.

Because the Walker is always on top of the bank, it can do stripping during otherwise idle periods. Bucyrus-Monighan Company, Chicago, Illinois.

BUCYRUS MONIGHAN

Walking Draglines 1 to 10 cubic yards

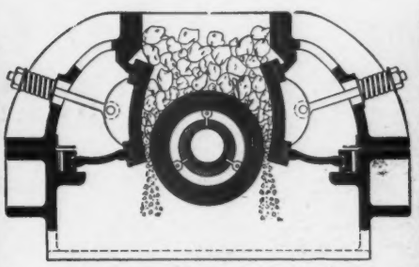
Sold by

BUCYRUS-ERIE CO.

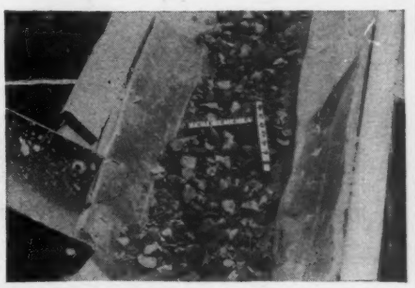
South Milwaukee, Wisconsin

Representatives throughout the U. S. A. Branch Offices: Boston, New York, Philadelphia, Birmingham, Chicago, Pittsburgh, St. Louis, Kansas City, Dallas, San Francisco. Offices or Distributors throughout the world. B-64

Product as made with standard type of jaw crusher. Note slabs and oversize. About 75% rejects and 25% finished product



Not a roll crusher. Featuring slow creep mantle for distribution of wear



Product as made with Bonnot Reduction Crusher. Note absence of slabs, fines and oversize. About 85% finished product Same material and setting

BONNOT REDUCTION CRUSHERS

Save time—save power—reduce production cost—increase capacity—assure more accurate sizing—eliminate untimely shutdowns—reduce upkeep costs—deliver material that is high in strength and bonding values and flawless. Wearing parts of manganese steel. Concaves are reversible. Frame is cast steel. Bronze sleeve bearings. Renewable liners. Extra large shaft. Positive pressure lubrication. Cast-iron safety plates. Let us quote money-saving prices on Crushers—Hammer Mills—Pulverizers—Cement Mill Machinery—Rotary Kilns—Disc Feeders, etc.

THE BONNOT COMPANY

—Since 1891—

CANTON, OHIO

New York Office
30 Church St.

CROSS
PERFORATED METAL SCREENS

Cross Cylindrical and Conical Screens are preferred by many of the most prominent operators.

ESPECIALLY designed for the accurate sizing of granular products: Sand, Gravel, Slag, Stone, Coal, Coke, Ores, Chemicals, Grains, Minerals, etc.

Cylindrical Screen Sections
Conical Screen Sections
Vibrating Screen Plates
Shaker Screen Plates

Manufactured for all makes of the above type units, or to individual specifications.

Cylindrical and Conical Screens can be made in one section or any number of sections or segments required; with butt straps, clips or other fastenings.

Round—Square—Slot or Hexagon Holes
Straight Rows or Staggered.

Quality, Price and Delivery *Dependable*

Agencies in all principal cities.

Consult your telephone directory

New Catalog on request.

We are at all times pleased to cooperate in solving your screening problems.

CROSS ENGINEERING CO. -:- Carbondale, Pa.

THE BIG BOY THAT GETS BIG RESULTS

Some Crusher This
DIXIE MOGUL
Non-Clog Hammer Mill

Puts an end to experimenting—stops high production costs—eliminates excessive upkeep charges.

Here's a better, stronger, more efficient crusher that gives the operator higher capacity and larger profits every day of the year. That SPECIAL MOVING BREAKER PLATE alone saves hundreds of dollars in replacement costs and shut-down losses because it presents 26 times average wearing area. You can have your choice of 40 sizes — in any capacity — Primary — Secondary or Fine Reduction.

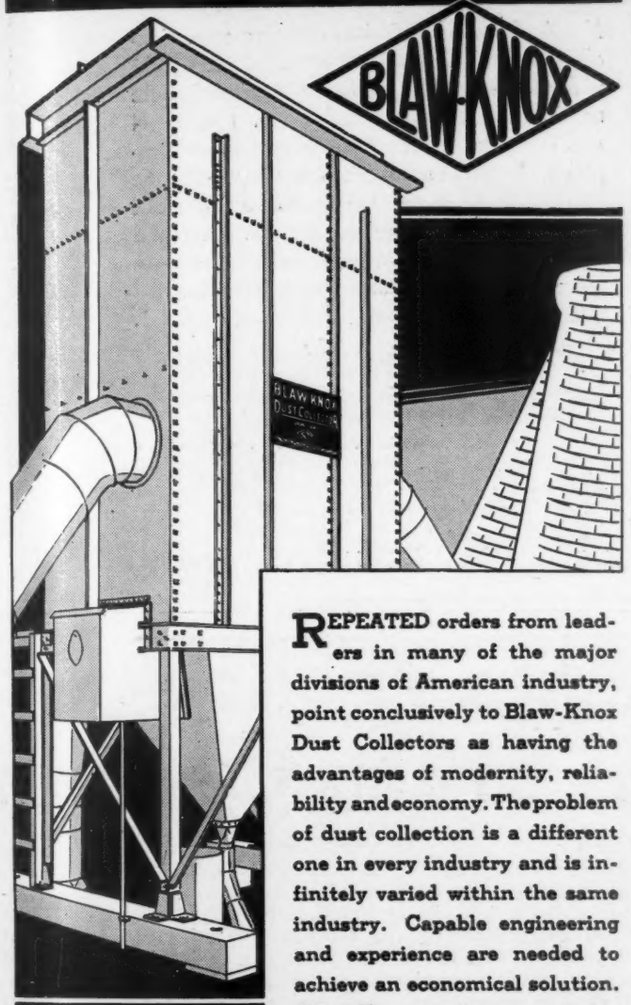
Ask for the latest crushing facts as they apply to 1934 requirements!

DIXIE HAMMERMILLS

DIXIE MACHINERY MFG. COMPANY
4209 Goodfellow Ave. **St. Louis, Missouri**

DUST COLLECTORS

BLAW-KNOX



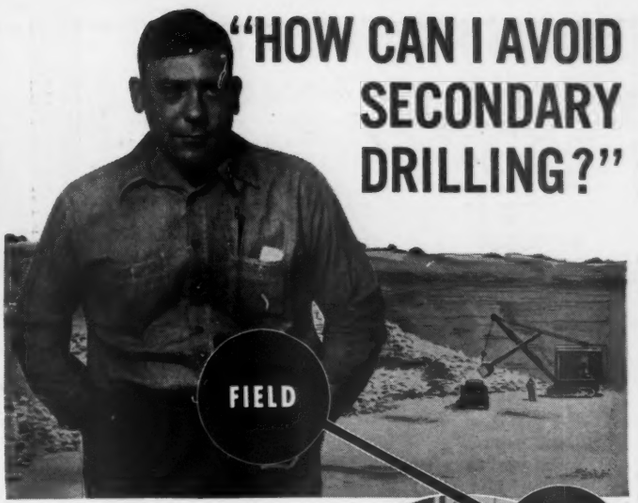
REPEATED orders from leaders in many of the major divisions of American industry, point conclusively to Blaw-Knox Dust Collectors as having the advantages of modernity, reliability and economy. The problem of dust collection is a different one in every industry and is infinitely varied within the same industry. Capable engineering and experience are needed to achieve an economical solution. Blaw-Knox engineers are specialists in this work—they decide quickly and without hesitation on the character of installation to fit the need. Such service is free from obligation to anyone having dust problems and you will gain through receiving Blaw-Knox advice.

SUBMIT YOUR DUST PROBLEMS TO BLAW-KNOX *for solution*

BLAW-KNOX COMPANY
2035 Farmers Bank Building
Pittsburgh, Pa.

BLAW-KNOX

"HOW CAN I AVOID SECONDARY DRILLING?"



Extra drilling—extra shooting—extra expense. That's what quarrymen were up against. "How can we avoid this secondary work?" they asked Gardner-Denver.

Gardner-Denver had the answer: Gardner-Denver Wagon Drills. With these drills, you can drill faster and make smaller, more closely-spaced holes. That means better powder distribution, better fragmentation—no block hole drilling and shooting. The holes are easy to spot and collar because of the quick-acting centralizers. The wagon drill is easily moved by hand.

For other quarry work there's the Gardner-Denver S-55 Sinker—the fastest, most dependable 55-pound drill on the market.

Gardner-Denver builds rock drills from experience gained *in the field*. Write for free bulletins on the WD2 Wagon Drill and S-55 Sinker.

GARDNER-DENVER CO.
104 Williamson St. Quincy, Ill.

PRODUCT

WD2 WAGON DRILL

GARDNER-DENVER

MAKES AIR DO MORE AND COST LESS

Like breathing through a handkerchief ...

but sure protection against microscopically fine dust...

The M·S·A Comfo RESPIRATOR

M.S.A. Comfo-Respirators combine exceptionally low breathing resistance and light weight with easy, snug-fitting adjustment and absolute non-interference with goggles, etc. Men CAN and DO wear them all day long without complaint. Equally important, Comfos provide the best available protection against all industrial dusts, the longest service life per filter and the lowest filter replacement cost. Investigate these proved dust respirators—write for the M.S.A. Comfo-Respirator Bulletin—No. CR-1.

MINE SAFETY APPLIANCES COMPANY
Braddock, Thomas and Meade Streets, Pittsburgh, Pa.
District Representatives in Principal Cities

M.S.A. Products include Breathing Apparatus . . . Inhalators . . . Masks of all types . . . Gas Indicators . . . Gas Detectors . . . M.S.A. Safety Goggles . . . M.S.A. Protective Hats and Caps . . . Edison Electric Cap Lamps . . . Safety Clothing . . . First Aid Equipment . . . Submarine Escape Apparatus . . . Descriptive Bulletins will be sent on request.

MINE SAFETY APPLIANCES CO. PITTSBURGH, PA.

Crushes 36" Rock to 1¼" in One Operation

Due to their ability to handle power shovel loaded rock and reduce to commercial sizes in ONE OPERATION WITH ONE CRUSHER, Williams Hammer Crushers have shown remarkable savings in many quarries. By handling the large stone much sledging and secondary blasting is avoided. As only one crusher is required there is a saving in investment of 50% to 75% as you also save in smaller buildings, fewer foundations, conveyors, drives and motors. A cubular product free from slivers and slabs is another Williams advantage. Let us tell you about a Williams for your work. A size for every job. Capacities 3 to 300 tons per hour.

Williams Patent Crusher & Pulverizer Co.
800 St. Louis Ave., St. Louis, Mo.

Chicago	New York	San Francisco
37 W. Van Buren St.	15 Park Row	326 Rialto Bldg.

THE WILLIAMS PATENT CRUSHER & PULVERIZER CO. ST. LOUIS, MO. U.S.A. TRADE MARK REG. U.S. PAT. OFF.

Williams

OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD

WILLIAMS

PATENT CRUSHERS · GRINDERS SHREDDERS

"Sq"=Production
"Round"=Accuracy

In the coined name "Sqround"* you'll find the key to the dual advantages of this new Hendrick mesh.

"Sqround" mesh gives the capacity of square perforations with the accuracy of round holes. Note that the distance between fillets in the corners of "Sqround" Mesh is the same as the diameter of an equivalent round opening. No chance for oversize to get through there.

Hendrick "Sqround" Mesh is available in any size required, in straight or staggered perforations, in flat plate or in Hendrick Double Corrugated Plate. Write for complete data.

*Registered United States Patent Office.

HENDRICK MFG. CO.
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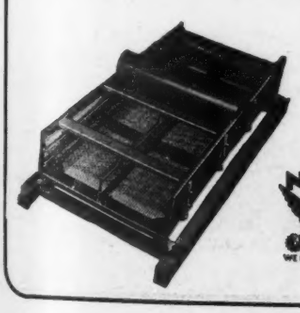
Baltimore Birmingham Boston
Cincinnati Cleveland Detroit Hazleton
New York Philadelphia Pittsburgh

Makers of Elevator Buckets of all types, Mitco Open Steel Flooring, Mitco Shur-Site Treads and Mitco Armorgrids. Light and Heavy Steel Plate Construction.

YOU DON'T BELIEVE IN Santa Claus

Yet the claims made for high-priced screens are many times as fanciful as the stories we used to believe about Old Santa. Ornaments belong on Christmas trees—not on screens. Gadgets mean increased cost.

UNIVERSAL Super Vibrators are now more efficient than ever. They are simple, sturdy and efficient. They give you increased capacity at lowest cost. Smooth, frictionless operation—elimination of blinding—accuracy of sizing—low upkeep cost—these and many other advantages make the UNIVERSAL an exceedingly sound investment — and the price is so much lower than one would expect to pay.



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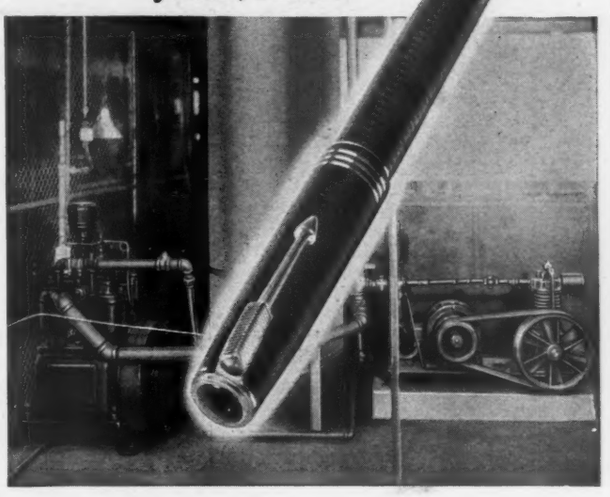
UNIVERSAL VIBRATING SCREEN CO.
RACINE....WIS.

We save space and money with Curtis Compressors

writes the
PARKER PEN COMPANY
*Janesville, Wisconsin**



THE Parker Pen Plant uses compressed air to operate 8 furnaces, 20 ejectors on punch presses, control their "dry pipe" sprinkler system, operate valves on special machines, and for many cleaning and blowing operations.

Mr. D. A. McLaughlin, Superintendent of the Parker Pen Company, writes:

"Our two Curtis Compressors are not only more efficient, quiet and satisfactory than the equipment they replaced, but they deliver compressed air at the remarkably low cost of 60 cubic feet a minute for 12 cents an hour. *The maintenance cost of these compressors is negligible. It has not even been necessary to remove carbon since their installation over a year ago."*

The experience of the Parker Pen Company is typical of many companies which are enjoying low cost Curtis Compressed Air Service. *A complete report by D. A. McLaughlin, Superintendent of the Parker Pen Company on this Curtis installation will be of vital interest to production executives. Write for your copy today.

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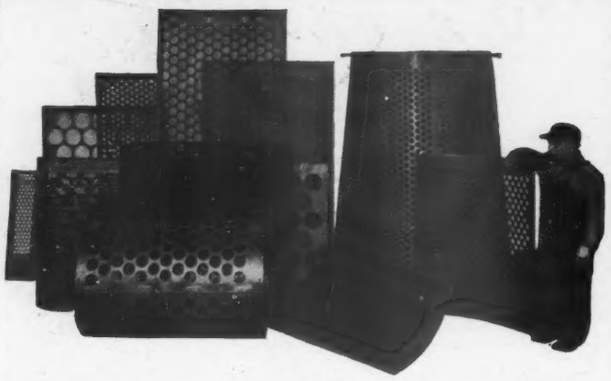
SCREENS of Perforated Metal



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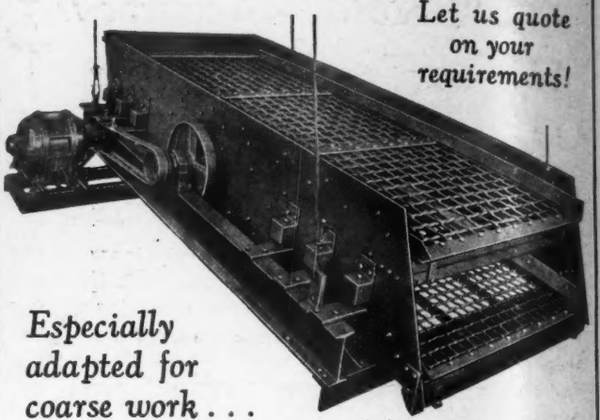
Positive Circle-Throw Vibration

Let us quote on your requirements!



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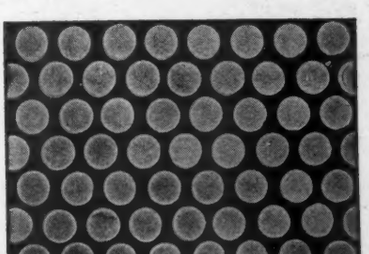

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Prices are right
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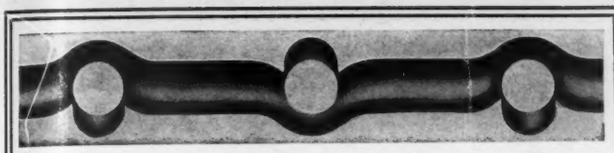
SAN FRANCISCO Offices in Principal Cities TORONTO



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SHOVELS-CRANES-CLAMSHELLS-DRAGLINES
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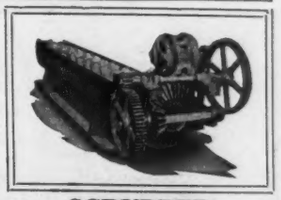

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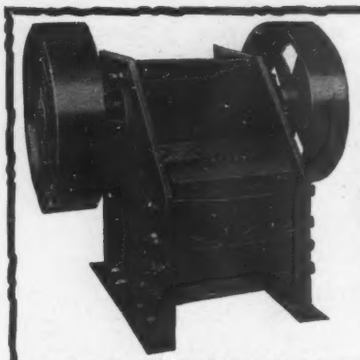

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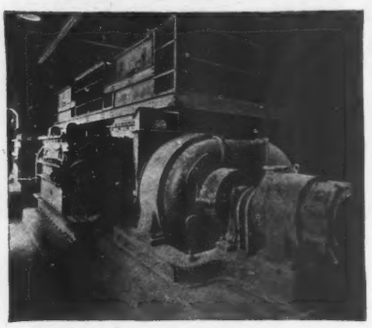

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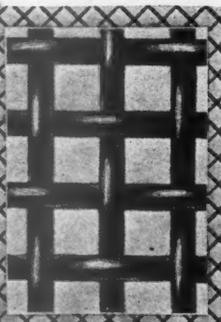

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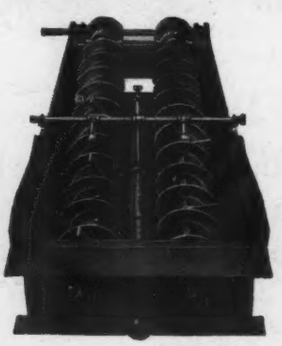

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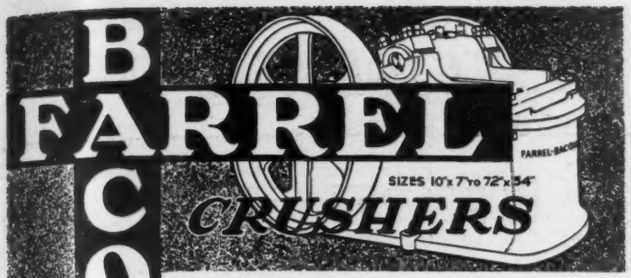

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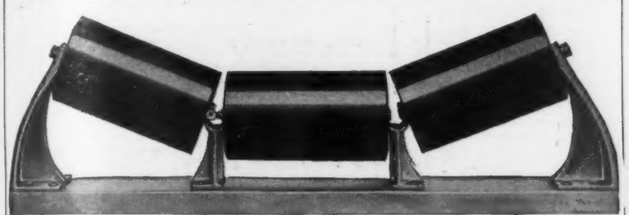

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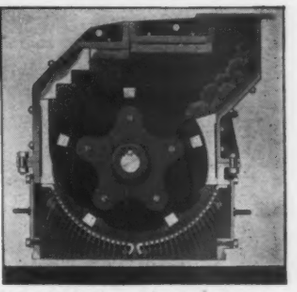

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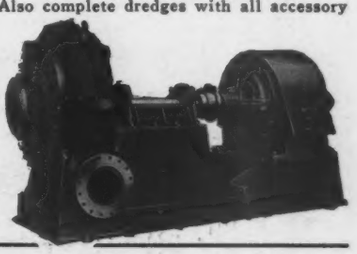

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Swing hammer mills.
3'x25'-4'x30'-5'x50'-5½'x40'-6'x50' direct heat rotary dryers.
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One 6'x8' Traylor ball mill.
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1—5-ft. x 35-ft. Link Belt Sand Drag, with silent chain drive, practically new.

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Electric Draglines, 2- and 3-yd.
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Sauerman 100' Steel Mast, 1-yd. slackline bucket.
Electric, gasoline & steam driven air compressors.
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IMPROVED CONCAVES
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3—½ yd. Drag Scraper outfits (gasoline powered) .....$250.00 up
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5—Air Separators—30", 10', 12', 14'.

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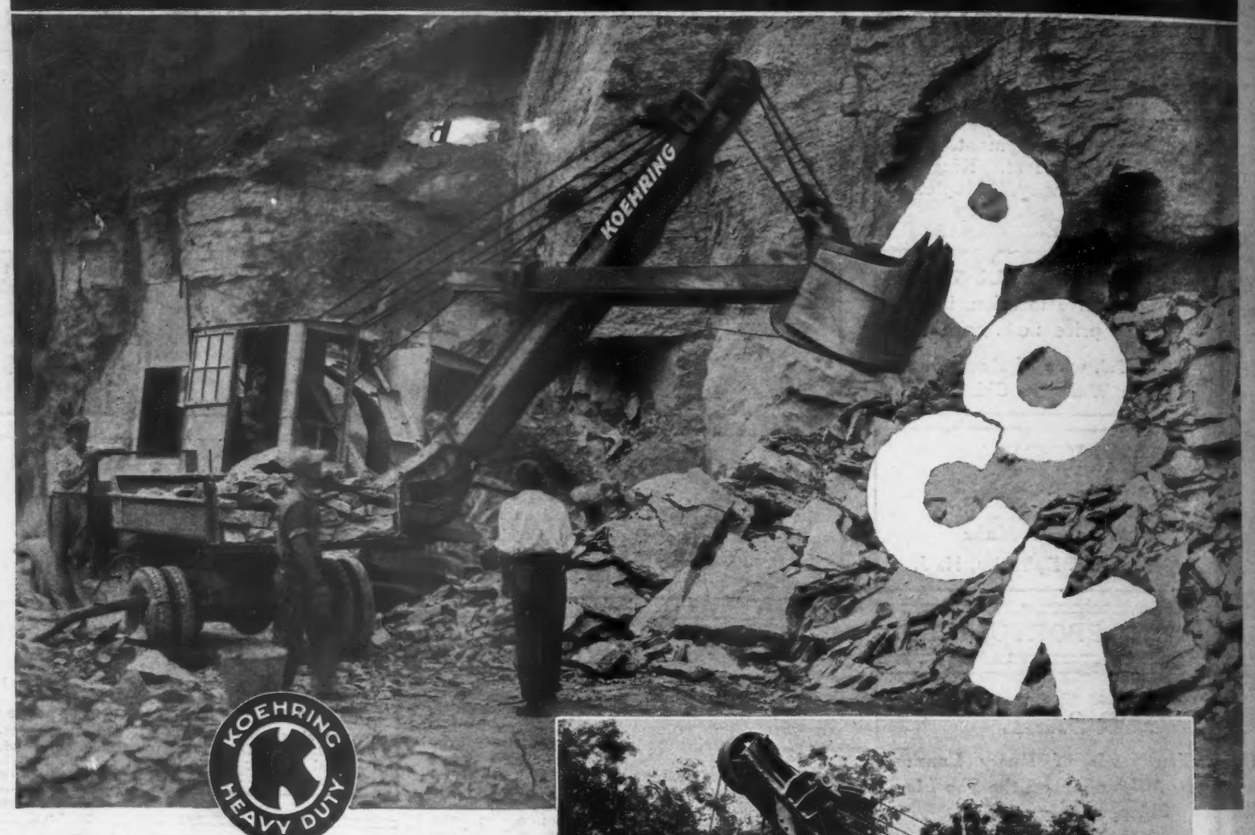

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